



STEELHEAD FISH HATCHERY EVALUATIONS—IDAHO

Project Progress Report



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Steelhead Fish Hatchery Evaluations—Idaho

Period Covered: October 1, 1992 to September 30, 1993

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ABSTRACT

This annual report summarizes activities associated with Idaho Lower Snake River Compensation Plan (LSRCP) hatcheries' activities from October 1, 1992 to September 30, 1993. Included in this report are all fall 1992 and spring 1993 adult steelhead trout *Oncorhynchus mykiss* returns and all releases of juvenile steelhead trout made within the reporting period. Information presented in this report supersedes that included in previous reports.

An estimated 11,594 LSRCP steelhead returned to Idaho during this reporting period. Magic Valley Fish Hatchery produced an estimated 6,005 adult steelhead, and Hagerman National Fish Hatchery produced an estimated 5,589 adult steelhead. Steelhead returns to Idaho remain well below the LSRCP program mitigation goal of 39,260 fish.

Adult returns to Idaho LSRCP hatchery racks included 1,591 A-strain steelhead to Sawtooth Fish Hatchery and 176 B-strain steelhead to East Fork Salmon River satellite facility. Approximately 73% of the steelhead that returned to Sawtooth Fish Hatchery were males, as compared to 56.3% of the fish that returned to the East Fork Salmon River satellite.

Coded-wire tags were used to determine smolt-to-adult return rates. Dworshak B-stock steelhead, brood year 1988, reared at Hagerman National Fish Hatchery and released into the East Fork Salmon River had a smolt-to-adult return rate of 0.05%. Sawtooth A-stock steelhead, brood year 1989, reared at Hagerman National Fish Hatchery and released at Sawtooth Fish Hatchery and at the Shoup Bridge (located on the Salmon River) had smolt-to-adult return rates of 0.64% and 0.31%, respectively. East Fork B-stock steelhead, brood year 1988, reared at Magic Valley Fish Hatchery and released into the East Fork Salmon River had a smolt-to-adult return rate of 0.10%. Pahsimeroi A-stock steelhead, brood year 1989, reared at Magic Valley Fish Hatchery and released at the Sawtooth Fish Hatchery had a smolt-to-adult return rate of 0.31%.

In April 1993, Idaho LSRCP hatcheries released 3,739,842 brood year 1992 steelhead smolts. A total of 599,678 of these fish were tagged with coded-wire tags. In addition, 2,200 steelhead smolts were released with passive integrated transponder (PIT) tags.

In September 1993, Clearwater Fish Hatchery released 50,027 brood year 1993 steelhead fingerlings into the South Fork Clearwater River for Idaho's Supplementation Studies program. Five thousand of the fingerlings were tagged with PIT tags.

INTRODUCTION

The Water Resources Development Act of 1976 (90 Stat. 2917) authorized the Lower Snake River Compensation Plan (LSRCP) to mitigate for fish losses caused by the construction and operation of Ice Harbor, Lower Monumental, Little Goose, and Lower Granite dams on the lower Snake River. Mitigation for anadromous fishery losses included the construction and operation of fish hatchery facilities and smolt passage improvements at the lower Snake River dams. The United States Fish and Wildlife Service was authorized to administer the operation and maintenance for 12 hatcheries and 11 satellite facilities in Idaho, Oregon, and Washington.

In Idaho, the Idaho Department of Fish and Game (IDFG) operates Clearwater Fish Hatchery, McCall Fish Hatchery, Magic Valley Fish Hatchery, Sawtooth Fish Hatchery, South Fork Salmon River Trap, East Fork Salmon River Trap, and Red River, Crooked River, and Powell satellite facilities. The United States Fish and Wildlife Service operates Dworshak National Fish Hatchery and Hagerman National Fish Hatchery. Adult return goals for the entire LSRCP are 8,000 summer chinook salmon *Oncorhynchus tshawytscha*, 50,700 spring chinook salmon, 18,300 fall chinook salmon, and 55,100 steelhead trout *O. mykiss* to the Snake River basin. Adult return goals for the Idaho portion of the LSRCP program call for the return of 8,000 adult summer chinook salmon, 40,432 adult spring chinook salmon, and 39,260 adult steelhead. Adult return goals for Idaho LSRCP steelhead hatcheries are as follows: Clearwater Fish Hatchery—14,000, Hagerman National Fish Hatchery—13,600, and Magic Valley Fish Hatchery—11,660.

The LSRCP program includes a Hatchery Evaluation Study component to monitor and evaluate the mitigation hatchery program. The primary objective of the Hatchery Evaluation Study is to determine the best hatchery management practices for mitigation hatcheries to meet LSRCP and IDFG anadromous fisheries goals. Only if we understand the effects of hatchery operations on adult return characteristics (e.g., return rates, sex ratios, age structure) can we prescribe effective management actions. Tasks defined to satisfy the primary objective are divided into two categories: 1) documentation, and 2) investigation. We document hatchery practices for each brood year, or cohort, of fish and mitigation status in terms of annual adult returns. Our success at achieving LSRCP and IDFG goals can then be related to hatchery practices through the documentation tasks. Investigation tasks are manipulative experiments involving modified or alternative hatchery practices that show potential for increasing adult returns and achieving LSRCP and IDFG goals.

OBJECTIVES

This report summarizes steelhead Hatchery Evaluation Study activities carried out from October 1, 1992 through September 30, 1993. Juvenile steelhead released from Clearwater, Hagerman National, and Magic Valley fish hatcheries during this reporting period are documented, as well as adult steelhead that returned to Idaho during the fall of 1992 and the spring of 1993 (hereafter referred to as the 1992-1993 return). Specific objectives identified in Cooperative Work Agreement 14-48-0001-93500 are covered in this report and are as follows.

Objective 1. Document the success of the IDFG LSRCP program in meeting specific adult return goals.

Sub-objective 1.1 Document LSRCP fish rearing and release practices and adult returns in Idaho.

Objective 2. Identify factors limiting hatchery success and recommend possible improvements based on existing knowledge and experimentation.

Sub-objective 2.1 Continue ongoing documentation and monitoring to determine the relationships between adult returns and hatchery practices, characteristics of hatchery products, and juvenile survival.

Sub-objective 2.2 Conduct controlled studies (short-term experiments) to determine the relationships between adult returns and hatchery practices, characteristics of hatchery products, and juvenile survival.

The results of experiments performed under Sub-objective 2.2 are printed separately from this report. Some results from those experiments, such as juvenile migration characteristics and adult return rates for experimental groups, are included in this report.

METHODS

IDFG LSRCP Program Success Documentation—Objective 1

To document the overall success of the program, we compared the estimated number of adult steelhead that returned above Lower Granite Dam between October 1, 1993 and September 30, 1994 to the Idaho LSRCP goal of 25,260 adult steelhead. The 39,260 fish goal was not used because 14,000 of these fish were charged to Clearwater Fish Hatchery, which only became operational in 1992. Adults from the first smolt release from Clearwater Fish Hatchery will return in 1995, 1996, and 1997. The Harvest Monitoring Project estimated the total number of returning adults and partitioned the total return between Hagerman National Fish Hatchery and Magic Valley Fish Hatchery based on coded-wire tag (CWT) data. Results for Objective 1 are reported under *Results, Adult Returns*.

Hatchery Operations Documentation—Sub-objective 1.1

Hatchery operations between October 1, 1992 and September 30, 1993 are documented in this report. Pertinent rearing information affecting brood years 1992 and 1993 are discussed. Additional information which occurred before this reporting period may be included for brood year 1992 steelhead for completeness. Information was collected from Hatchery Brood Year and Run reports and memoranda and from verbal communications with hatchery personnel. Fish marking and tagging information was provided by IDFG's Coded-Wire Tag Laboratory.

Migration Conditions

Snake River discharge during smolt migration is a major factor affecting survival of Idaho's anadromous fishes. Flow conditions at Lower Granite Dam, Washington, for the 1993 emigration period, the year that brood year 1992 steelhead emigrated, are reported. Adults that returned

during this reporting period were from the 1988, 1989, or 1990 broods (depending on the stock and age-at-return). Flow conditions for 1989, 1990, and 1991 are reported since steelhead smolts are reared on a one-year program and released the following spring. Water flow data were obtained from Fish Passage Center reports and the United States Geological Survey Internet site.

Petrosky (1991) defined two time periods that accounted for most of the chinook emigration past Lower Granite Dam. The Extended period runs from April 20 to May 30 and includes the time when most of the wild and natural yearling chinook salmon emigrate, whereas the Peak period runs from April 15 to May 5 and encompasses the time when approximately 50% of the yearling chinook salmon emigrate past the dam. Hatchery steelhead smolts are generally released in April and emigrate during the same time period as chinook. Therefore, flows during the extended and peak time periods are reported.

Migration Timing and Juvenile Survival

Passive Integrated Transponder (PIT) tags were used to evaluate downstream juvenile emigration. The interrogation rate of PIT-tagged juvenile salmonids at Columbia and Snake river dams serves as a minimum survival index because: 1) an unknown (but we believe small) number of PIT-tagged fish that die in the hatchery may go undetected, although we scan the dead fish, 2) not all fish pass through detectors, 3) some PIT tags fail (approximately 2%, Russell Kiefer, IDFG, personal communication) or are lost between tagging and arrival at detection sites, 4) some fish arrive while detection gear is not being operated, and 5) mortality occurs between dams.

Steelhead juveniles were PIT-tagged by IDFG Fish Marking personnel. The PIT tag data were submitted to PTAGIS, a computerized PIT tag database operated by Pacific States Marine Fisheries Commission (Columbia River Basin PIT Tag Information System 1997). Interrogation rates and median travel times for specific PIT-tagged groups of steelhead were calculated after retrieving relevant interrogation data from PTAGIS. Interrogation rates were calculated for each PIT tag file (or files depending on the purpose of the tagging), by dividing the number of unique interrogations at Lower Granite, Little Goose, Lower Monumental, and McNary dams by the number of PIT-tagged fish released, multiplied by 100. Median travel times were calculated for each PIT tag file or files to Lower Granite Dam.

Adult Returns

Adult return goals for Clearwater Fish Hatchery, Hagerman National Fish Hatchery, and Magic Valley Fish Hatchery are 14,000, 13,600, 11,660 adult steelhead above Lower Granite Dam, respectively. The Harvest Monitoring Project (i.e., Ball 1996) estimated the total number of LSRCP steelhead that returned to Idaho in the 1992-1993 return. This estimate included LSRCP-reared fish that were harvested in Idaho's sport fishery and LSRCP-reared fish that escaped to spawn naturally or returned to hatchery racks. Ball's (1996) estimate should be considered a minimum estimate, because tributary and mainstem strays were not accounted for, nor were in-river pre-spawning mortalities. The number of steelhead smolts released and the estimated number of adults that returned were compared to facility design production targets and projected adult return goals for each facility.

Fisheries Contribution

Idaho Department of Fish and Game Fish Marking personnel tagged juvenile steelhead with coded-wire tags according to marking/tagging plans developed by fishery managers and research biologists. Steelhead tagged with a CWT had the left pelvic fin excised to indicate the presence of a tag. The snouts from tagged adult steelhead harvested in Idaho's sport fishery were sent to the Coded-Wire Tag Laboratory and processed. The Harvest Monitoring Project used these data, along with data from a statewide telephone survey, to estimate the total number of steelhead harvested in Idaho. The numbers of steelhead harvested from specific release groups were estimated by expanding CWT recoveries for specific groups. See Ball (1996) for methods.

Hatchery Weirs

The numbers of steelhead that returned to the East Fork Salmon River and Sawtooth Fish Hatchery weirs were documented by hatchery personnel. The length, sex, and disposition of each fish were recorded. Fish length and strain (A or B) were used to determine age-at-return. Snouts from coded-wire-tagged steelhead were sent to the Coded-Wire Tag Laboratory and processed. The Harvest Monitoring Project used these data to estimate the total number of LSRCP-reared steelhead that returned to hatchery racks or escaped to spawn naturally.

Smolt-to-Adult Return Rate

The Harvest Monitoring Project estimated the total number of LSRCP-produced steelhead that returned to Idaho. For each CWT code, we summed the estimated number of steelhead that returned to Idaho in the 1990-1991 (Ball 1992), 1991-1992 (Ball 1994), and the 1992-1993 (Ball 1996) harvest seasons. For specific groups of fish (i.e., individual CWT codes by release site), we calculated a smolt-to-adult return rate by dividing the estimated number of adults that returned (provided by the Harvest Monitoring Project) by the number of smolts released (provided by the Coded-Wire Tag Laboratory), multiplied by 100.

Experimentation—Objective 2

Interim progress reports, printed independent of this report, document the current status of Hatchery Evaluation Study experiments. Results for some experiments, particularly adult return rates and migration rates for experimental groups, are included in this report.

Clearwater Fish Hatchery

Cover Experiment—The purpose of this experiment was to test the effects of shade covers on adult return and juvenile emigration rates. The experiment was conducted using Dworshak B-stock steelhead from the 1992 brood. Floating shade structures made from PVC pipe were placed into raceways 9 and 10 (Cover Group). Raceway 11 was not equipped with shade structures (No Cover Group). Steelhead from each group were tagged with coded-wire tags and PIT tags (Appendix A. Table 1). Adults will return between 1995 and 1997. The total number of adults that return from each group will be tested using chi-square analysis ($\alpha = 0.05$) (SYSTAT Inc. 1992). PIT tags will be used to determine juvenile interrogation rates at Snake and Columbia river dams and median travel to Lower Granite Dam for each group. Chi-square analysis ($\alpha = 0.05$) will

be used to test for PIT tag interrogation rate differences between groups. The Mann-Whitney test ($\alpha = 0.05$) (SYSTAT Inc. 1992) will be used to test for travel time (to Lower Granite Dam) differences between groups.

Hagerman National Fish Hatchery

Size-at-Release Experiment—The purpose of this study was to determine the optimal size (length) to rear steelhead juveniles at Hagerman National Fish Hatchery. The experiment was conducted for two consecutive years using A-strain steelhead from brood years 1990 and 1991. For each year of the experiment, steelhead were programmed by feeding regime to reach two different sizes: large—2.5 to 3.0 fish per pound (fpp) (256-241 mm fork length) and regular—4.0 to 4.5 fpp (219-210 mm fork length). The CWT and PIT tag data will be used to test dependent variables associated with returning adults and migrating smolts, respectively. See Cannamela (1992) for complete details of the experimental design.

Acclimation Experiment—This study compared steelhead that were trucked from Hagerman National Fish Hatchery and acclimated at Sawtooth Fish Hatchery for two weeks (Acclimated Group) to steelhead that were trucked from Hagerman National Fish Hatchery two weeks later and released directly into the Salmon River (Non-acclimated Group). The two groups of fish were released at the same time and at the same location. The study was initiated in 1992 (1991 brood) and continued in 1993 (1992 brood). Pahsimeroi A-stock steelhead were used for both years of the study. Adults from brood year 1991 will return in 1994 and 1995; adult returns from the 1992 brood will be complete in 1996. Adult return data and juvenile emigration data will be analyzed by brood year. The total number of adults that return from each group will be tested using chi-square analysis ($\alpha = 0.05$). The PIT tag data will be used to determine unique interrogation rates at Snake and Columbia river dams and median travel to Lower Granite Dam for each group. Chi-square analysis ($\alpha = 0.05$) will be used to test interrogation rates between groups. Travel times for the two groups will be tested for differences using the Mann-Whitney test ($\alpha = 0.05$) (SYSTAT Inc. 1992).

RESULTS

Hatchery Operations Documentation - Sub-objective 1.1

Clearwater Fish Hatchery

Brood Year 1992—Clearwater Fish Hatchery received 397,000 eyed eggs, Dworshak B-stock, from Dworshak National Fish Hatchery in May, 1992 (George et al. 1994). Eggs were collected in April at Dworshak National Fish Hatchery during the Number 11, 12, and 13 egg-takes. Survival to the fry stage was 93.6% (371,688 fish) and survival to release was 82.2% (326,300). Adipose fins were excised from all fish in September and October 1992. Fish were moved to the chinook raceways in October 1992 as a result of a water leak in the main pipeline.

In January 1993, 69,323 fish were tagged with coded-wire tags and marked by excising the left pelvic fin. Fish were tagged with coded-wire tags to estimate adult contribution to the fishery and to test the effects of shade structures placed in raceways 9 and 10. In addition, 300 steelhead were tagged with PIT tags in January 1993. Only steelhead without coded-wire tags were tagged with PIT tags.

Clearwater Fish Hatchery released 326,300 steelhead smolts into the South Fork Clearwater River from April 12-14, 1993 (Appendix A, Table 1). There were 69,016 fish released with coded-wire tags and 300 fish released with PIT tags. See *Results, Experimentation - Objective 2, Clearwater Fish Hatchery, Cover Experiment* for PIT tag interrogation information.

It was discovered that all fish were inadvertently exposed to nitrogen supersaturated water just before being released. The water supply line used to fill the transport trucks at Clearwater Fish Hatchery was not equipped with a de-gassing station. Therefore, all fish were exposed to supersaturated water when they were transported to the release site. This problem was not discovered until fish released from Clearwater Fish Hatchery were later captured downstream at the Clearwater Smolt Monitoring Trap (Lewiston, Idaho) by IDFG personnel who reported that large numbers of fish had cataracts in one or both eyes. Clearwater Fish Hatchery personnel estimated that 33%-75% of the fish trapped in the smolt trap showed symptoms of gas bubble disease.

Brood Year 1993—Idaho Department of Fish and Game Fishery Management personnel in the Clearwater Region initiated a new program at Clearwater Fish Hatchery in 1993 that utilized wild Selway B-stock steelhead as the brood source (George et al. 1995). The purpose of the program was to develop a separate hatchery brood stock that would return to Crooked River. It was believed that Selway B-stock steelhead would return at a higher rate than Dworshak B-stock steelhead and would provide more harvest opportunities for anglers. Contact Fishery Management personnel in the Clearwater Region for program details.

Forty-two wild adult Selway B-stock steelhead were captured at Selway Falls between March 11 and April 2, 1993. Fish captured included 14 males (four one-ocean and 10 two-ocean) and 28 females (five one-ocean and 23 two-ocean). Fish were transported to Kamiah ponds for holding and were spawned between April 8 and May 5. Eggs from each female were separated into two to four buckets, and each bucket of eggs was fertilized with the milt from a different male. Eggs were disinfected and incubated at Clearwater Fish Hatchery. Ovarian samples were collected from each female and sent to the Eagle Fish Health Laboratory for infectious hematopoietic necrosis (IHN) virus testing. Test results for all samples were negative.

A total of 136,476 green eggs, Selway B-stock, were collected during spawning operations at the Kamiah ponds. Of these, 93.2% (127,162) developed to the eyed stage. Survival to the fry stage was 86.8% (118,515). All Selway B-stock steelhead had the right pelvic fin excised in September 1993.

Clearwater Fish Hatchery received 869,900 eyed eggs, Dworshak B-stock, from Dworshak National Fish Hatchery in April and May of 1993 (George et al. 1995). Eggs were collected at Dworshak National Fish Hatchery in April during the Number 10 through 13 egg-takes. Survival to the fry stage was 88.5% (769,862 fish).

A total of 50,027 Dworshak B-stock steelhead were released into the South Fork Red River as fingerlings in September for supplementation. These fish were marked by excising the right pelvic fin (i.e., right ventral fin-clip), and 5,000 were PIT-tagged. Steelhead used for

supplementation were not adipose fin-clipped. Contact IDFG's Idaho Supplementation Studies (Alan Byrne) for program details and PIT tag interrogation results.

All Dworshak B-stock steelhead, except those used for supplementation, were adipose fin-clipped in August 1993. Also in August, a total of 200,051 steelhead were tagged with coded-wire tags and 784 fish were tagged with PIT tags.

Hagerman National Fish Hatchery

Brood Year 1992—Hagerman National Fish Hatchery received a total of 2,332,710 eyed eggs comprised of two different stocks of steelhead: Sawtooth A-stock (1,256,701 eggs) and Pahsimeroi A-stock (1,076,009 eggs) (Hagerman National Fish Hatchery 1992). Survival rates from eyed eggs to the fry stage for the Sawtooth A-stock and the Pahsimeroi A-stock were 97% (1,219,000 fish) and 97.6% (1,050,574 fish), respectively. A total of 402,383 steelhead fingerlings were transferred to Lynn Babington Fish Hatchery in September and October 1992. These steelhead were being reared at Hagerman National Fish Hatchery to assist Niagara Springs Fish Hatchery. Excluding the fish transferred to Lynn Babington Fish Hatchery, survival rates from eyed eggs to smolt release for Sawtooth A-stock and Pahsimeroi A-stock were 78% (898,948 fish) and 76% (588,894 fish), respectively. No major health problems were reported.

Adipose fins were excised from all fish in September and October of 1992. In November 1992, 228,499 steelhead were tagged with coded-wire tags and marked by excising the left pelvic fin (Appendix A. Table 2). Fish were tagged with coded-wire tags to estimate adult contribution to the fishery and to test the effects of acclimating smolts at Sawtooth Fish Hatchery. In February 1993, 600 steelhead were tagged with PIT tags as part of the Sawtooth Acclimation Experiment to test emigration timing and interrogation rates for acclimated and non-acclimated steelhead.

Hagerman National Fish Hatchery released 1,487,842 steelhead smolts into the Salmon and Little Salmon rivers between April 8 and April 28, 1993 (Appendix A. Table 2). The total release included 898,948 Sawtooth A-stock and 588,894 Pahsimeroi A-stock steelhead. Fish were released at three locations: Sawtooth Fish Hatchery weir (729,520), Hammer Creek (211,006), and Hazard Creek (547,316). There were 228,499 fish released with coded-wire tags and 600 fish released with PIT tags. See *Results, Experimentation - Objective 2, Hagerman National Fish Hatchery, Acclimation Experiment* for PIT tag results.

Brood Year 1993—Hagerman National Fish Hatchery received a total of 2,019,973 eyed steelhead eggs in May and June 1993 comprised of two different stocks: Sawtooth A-stock (1,014,960 eggs) and Pahsimeroi A-stock (1,005,013 eggs) (Hagerman National Fish Hatchery 1993). Survival rates from the eyed egg stage to the fry stage for the Sawtooth A-stock and Pahsimeroi A-stock were 96.4 and 95.6%, respectively.

Magic Valley Fish Hatchery

Brood Year 1992—Magic Valley Fish Hatchery received a total of 2,487,548 eyed eggs comprised of three different stocks of steelhead: Dworshak B-stock (1,322,740 eggs), Pahsimeroi A-stock (1,031,274 eggs), and East Fork B-stock (133,826 eggs) (Ainsworth et al. 1993). Overall survival to the fry stage was 86.1% (2,140,861 fish) and survival to release was 77.4% (1,925,700 fish).

In November 1992, all steelhead were marked with adipose fin clips and 318,231 fish were tagged with coded-wire tags and marked by excising the left pelvic fin. Coded-wire tags were used to determine fishery contribution. In December 1992, flexibacteria was detected during a monthly health exam; however, no treatment was administered due to the low incidence of infection. In February 1993, 1,300 steelhead not tagged with coded-wire tags were tagged with PIT tags.

Magic Valley Fish Hatchery released a total of 1,925,700 brood year 1992 steelhead at seven different locations between April 7 and April 22, 1993 (Appendix A. Table 3). The total release included 903,400 Dworshak B-stock, 915,900 Pahsimeroi A-stock, and 106,400 East Fork B-stock steelhead. A total of 302,163 fish were released with coded-wire tags and marked by excising the left pelvic fin. In addition, 1,300 steelhead were released with PIT tags (Appendix A. Table 3). Brood year 1992 fish had no major disease outbreaks and hatchery personnel reported that the fish were in excellent condition.

Interrogation rates for groups of PIT-tagged fish ranged from 51.0 to 78.0% (Table 1). Median travel times to Lower Granite Dam for groups of PIT-tagged fish ranged from 15.5 to 38.0 days (Table 1).

Brood Year 1993—Magic Valley Fish Hatchery received a total of 2,767,613 eyed steelhead eggs comprised of three different stocks: Dworshak B-stock (1,507,033 eggs), Pahsimeroi A-stock (1,081,500 eggs), and East Fork B-stock (179,080 eggs) (Ainsworth et al. 1995). Survival rates from the eyed egg stage to the fry stage were as follows: Dworshak B-stock—97.1%, Pahsimeroi A-stock—99.3%, and East Fork B-stock—99.4%. In July 1993, 392,300 surplus fry, Dworshak B-stock, were shipped to Salmon Falls (227,600 fry) and Oakley (164,700 fry) reservoirs.

Migration Conditions

Snake River in-flows (mean in-flow) at Lower Granite Dam during the peak period in 1993 were the largest since 1989 (Table 2). Moreover, the flows during the extended period were the largest since 1984.

Comparing Snake River flow conditions for the three brood years of steelhead that returned to Idaho as adults during this reporting period (broods 1988, 1989, and 1990), the 1988 brood (which emigrated in 1989) had the largest river discharge during both the peak and extended migration periods (Table 2). The 1990 brood (which emigrated in 1991) had the lowest river discharge during the peak migration period.

Migration Timing and Juvenile Survival

A total of 2,200 steelhead smolts were released with PIT tags in 1993: Clearwater Fish Hatchery—300, Hagerman National Fish Hatchery—600, and Magic Valley Fish Hatchery—1,300 (Table 1). Overall, 65% (1,429) of the fish PIT-tagged were interrogated at downstream dams. Interrogation rates of PIT-tagged steelhead, by PIT tag file, ranged from 51.0 to 78.0% (Table 1). Median travel times to Lower Granite Dam for PIT-tagged steelhead, by PIT tag file, ranged from 15.5 to 38.0 days (Table 1). Most of the steelhead tagged with PIT tags were interrogated at Lower Granite Dam between April 20 and May 30 (Figure 1). Flow conditions for the Snake River at Lower Granite Dam during this time period ranged from approximately 55 to 180 thousand cubic feet per second.

Adult Returns

The Harvest Monitoring Project (Ball 1996) estimated that Magic Valley Fish Hatchery and Hagerman National Fish Hatchery returned 11,594 steelhead to Idaho in 1992-1993 (Table 3). Ball (1996) estimated that 8,747 steelhead were harvested in Idaho's sport fishery, and 2,847 steelhead returned to hatchery racks or escaped to spawn naturally. These estimates do not include tributary and mainstem strays or pre-spawning mortalities. The 1992-1993 steelhead return included 1-ocean, 2-ocean, and 3-ocean fish. The number of steelhead smolts released and the estimated number of adults that returned are compared to facility design production targets and projected adult return goals in Table 4. Hagerman National Fish Hatchery and Magic Valley Fish Hatchery achieved a minimum of 46% of their combined adult return goals (Table 4). Adult return estimates include only steelhead that returned to hatchery weirs, steelhead that were harvested in Idaho's sport fishery, and steelhead that escaped to spawn naturally.

Fisheries Contribution

Ball (1996) estimated that 8,747 LSRCP-reared hatchery steelhead were harvested during the 1992-1993 Idaho sport fishing season. See Ball (1996) for creel survey methods and results.

Hatchery Weirs

Sawtooth Fish Hatchery Weir—Hatchery steelhead returning to the Sawtooth Fish Hatchery in 1993 were A-strain fish released in 1990 and 1991 (brood years 1989 and 1990, respectively). Smolts were reared at Hagerman National and Magic Valley fish hatcheries prior to being trucked to Sawtooth Fish Hatchery and released.

A total of 1,591 adult steelhead (A-strain), comprised of 1,154 males (72.5%) and 437 females (27.5%), returned to the Sawtooth Fish Hatchery weir between March 18 and May 12, 1993 (Table 5) (Chapman 1993). The male component of the run was comprised of 1,151 hatchery origin fish and three natural origin (unmarked) fish; the female component was made up of 433 hatchery origin fish and four natural origin fish. All of the natural origin fish and 661 of the hatchery origin fish (487 males and 174 females) were released to spawn naturally. A total of 255 females and 530 males were spawned on 11 different dates to yield 1,131,877 green eggs. A total of 1,031,635 eggs (91.1%) developed to the eyed stage. Disease samples collected during the spawning operations tested negative for IHN virus and bacteria.

East Fork Salmon River Weir—Hatchery steelhead returning to the East Fork Salmon River weir in 1993 were B-strain fish released in 1989, 1990, and 1991 (brood years 1988, 1989, and 1990, respectively). Smolts were reared at Hagerman National and Magic Valley fish hatcheries.

A total of 176 adult steelhead (B-strain), comprised of 99 males (56.3%) and 77 females (43.7%), returned to the East Fork Salmon River weir between March 30 and May 12, 1993 (Table 6) (Chapman 1993). The male component of the run was comprised of 91 hatchery origin fish (91.9%) and eight natural origin (unmarked) fish (8.1%), and the female component was made up of 68 hatchery origin fish (88.3%) and nine natural origin fish (11.7%). All of the natural origin fish and 56 of the hatchery origin fish (34 males and 22 females) were released to spawn naturally. Forty-six females and 57 males were spawned on nine different dates and produced 211,993 green eggs. A total of 178,925 eggs (84.4%) developed to the eyed stage.

Smolt-to-Adult Return Rates

Clearwater Fish Hatchery

Clearwater Fish Hatchery became operational in 1992. The first steelhead smolts were released in April 1993 (brood year 1992). Adults resulting from this release will return in 1995, 1996, and 1997.

Hagerman National Fish Hatchery

The 1992-1993 steelhead return included three age classes of fish which were released from Hagerman National Fish Hatchery in 1989 (brood year 1988), 1990 (brood year 1989), and 1991 (brood year 1990). Brood year 1988, 1989, and 1990 steelhead returned as 3-ocean, 2-ocean, and 1-ocean fish, respectively. The Harvest Monitoring Project estimated that 5,589 of the steelhead that returned to Idaho in 1992-1993 were reared at Hagerman National Fish Hatchery (Table 3). This equals 41.1% of the hatchery's adult return goal (13,600 fish). However, the number of smolts released in 1988, 1989, and 1990 was approximately 60% of the smolt production target for each year (Table 4).

A total of 1,472,623 steelhead were released in 1989 (brood year 1988). Adult return data were not available for the smolts released into Clear Creek and the South Fork Clearwater River. Excluding the Clear Creek and South Fork Clearwater River fish releases, an estimated 1,391 adults returned from 1,073,127 smolts released in 1989 to yield a SAR of 0.13% (Appendix B. Table 1). In 1990, 1,439,266 steelhead smolts (brood year 1989) were released (Appendix B. Table 2). The 2-ocean adult component for this brood returned during this reporting period. To date, an estimated 6,126 steelhead have returned to Idaho to yield a SAR of 0.43%. In 1991, Hagerman National Fish Hatchery released 1,436,910 brood year 1990 steelhead smolts (Appendix B. Table 3). Adult return data, specifically the 2- and 3-ocean components, for brood year 1990 are incomplete at this time.

The final adult steelhead from the 1988 (B-strain) and 1989 (A-strain) broods returned to Idaho during this reporting period. The smolt-to-adult return rates were calculated for coded-wire-tagged smolts, by stock and release site (Table 7). Smolt-to-adult return rates for Sawtooth A-stock steelhead smolts, brood year 1989, released at the Sawtooth Fish Hatchery weir and at Shoup Bridge (Salmon River) were 0.64% and 0.31%, respectively (Table 7). The SAR for brood year 1988 Dworshak B-stock steelhead released into the East Fork Salmon River was 0.05%.

Magic Valley Fish Hatchery

The 1992-1993 steelhead return included three age classes of fish which were released from Magic Valley Fish Hatchery in 1989 (brood year 1988), 1990 (brood year 1989), and 1991 (brood year 1990). Brood year 1988, 1989, and 1990 steelhead returned as 3-ocean, 2-ocean, and 1-ocean fish, respectively. The Harvest Monitoring Project estimated that 6,005 of the adult steelhead that returned to Idaho in 1992-1993 were reared at Magic Valley Fish Hatchery (Table 3). This equals 51.5% of the hatchery's adult return goal (11,660 fish).

A total of 2,201,994 steelhead smolts were released in 1989 (brood year 1988) from Magic Valley Fish Hatchery. An estimated 3,830 of these smolts returned to Idaho as adults (Appendix C. Table 1). The SAR for brood year 1988 was 0.17%. A total of 2,122,900 steelhead smolts were released from Magic Valley Fish Hatchery in 1990 (brood year 1989). The 3-ocean adult component of brood year 1989 is not complete. To date, an estimated 6,881 steelhead have returned to Idaho to yield a SAR of 0.32% (Appendix C. Table 2). In 1991, Magic Valley Fish Hatchery released 2,062,000 steelhead smolts (brood year 1990). Adult return data, specifically the 2- and 3-ocean components, for brood year 1990 are incomplete at this time (Appendix C. Table 3).

The final adult steelhead from the 1988 (B-strain) and 1989 (A-strain) broods returned to Idaho during this reporting period. Smolt-to-adult return rates were calculated for coded-wire-tagged smolts, by stock and release site (Table 7). East Fork B-stock steelhead smolts released at the East Fork Salmon River had a SAR of 0.10% (Table 7). Sawtooth A-stock steelhead smolts released at the Sawtooth Fish Hatchery weir had a SAR of 0.31%.

Experimentation - Objective 2

Clearwater Fish Hatchery

Cover Experiment—The PIT tag interrogation rates to downstream dams were as follows: raceway 9 (Cover Group)—71%, raceway 10 (Cover Group)—70%, and raceway 11 (No Cover Group)—75%. The number of PIT-tagged steelhead interrogated at downstream dams was not significantly different ($\chi^2 = 0.0001$, $P = 1.0$) between the two raceways in the Cover Group (i.e., raceway 9 vs. raceway 10). Therefore, these data were pooled and tested against PIT tag data for raceway 11 (i.e., the No Cover Group). Chi-square analysis determined that interrogation rates were not significantly different ($\chi^2 = 0.47$, $P = 0.495$) between groups. Median travel time to Lower Granite Dam for steelhead with shade covers was approximately 17 days, whereas the median travel time for fish without shade covers was approximately 21 days (Table 1). However, there was no significant difference ($P = 0.059$) in travel times to Lower Granite Dam between groups.

As mentioned previously, all steelhead released from Clearwater Fish Hatchery in 1993 were inadvertently exposed to water supersaturated with nitrogen. Therefore, the integrity of this experiment may have been compromised. Adults will return in 1995, 1996, and 1997.

Hagerman National Fish Hatchery

Size-at-Release Experiment—The first adults from this experiment returned during this reporting period. A total of 179 adult steelhead returned to Idaho as 1-ocean fish. Of these, 102 were from the large size group and 77 were from the regular size group (Table 8). For adults that returned from the large size group, 35% (36) were females and 65% (66) were males. Adult returns from the regular size smolts were composed of 47% (36) females and 53% (41) males. Sixty-one percent of the adults that returned to Idaho were harvested in Idaho's sport fishery. Adult returns for brood years 1990 and 1991 will be complete in 1994 and 1995, respectively. Complete results of this study will be reported in a separate report.

Acclimation Experiment—For brood year 1992, a total of 188 (62.7%) of the PIT-tagged acclimated steelhead were interrogated at downstream dams as compared to 161 (53.7%) of the

tagged non-acclimated fish (Table 1). Interrogation rates were not significantly different ($P > 0.05$) among replicate raceways for each group. Therefore, data from replicate raceways, within group, were pooled and an overall chi-square test was performed. There were significantly ($\chi^2 = 4.63$, $P = 0.031$) more acclimated fish interrogated than non-acclimated fish. Among replicate raceways, median travel times to Lower Granite Dam ranged from 34.0 to 36.7 days for the acclimated group and from 31.3 to 36.3 days for the non-acclimated group (Table 1). Travel times to Lower Granite Dam were not significantly ($P = 0.182$) different between groups.

Adults from brood year 1992 will return in 1995 and 1996. Adult steelhead from the first year of the study, brood year 1991, will return in 1994 and 1995. Complete results of this study will be reported in a separate report.

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Table 1. Number of unique PIT tag interrogations of LSRCP steelhead smolts, by PIT tag file, at Lower Granite Dam (GRJ), Little Goose Dam (GOJ), Lower Monumental Dam (LMJ), and McNary Dam (MCJ) for the 1993 migration period. A total of 2,200 PIT-tagged steelhead were released from Hagerman National, Magic Valley, and Clearwater fish hatcheries between April 8 and April 21, 1993. Median travel time is to Lower Granite Dam.

File Name	Release Site	Rel. Date	No. Rel.	Number / Percent Interrogated										Median Travel Time (Days)	
				GRJ		GOJ		LMJ		MCJ		TOTAL			
				No.	%	No.	%	No.	%	No.	%	No.	%		
<u>Magic Valley Hatchery Contribution Study</u>															
<i>Dworshak B-stock</i>															
DAC93054.M01	E.F. Salmon R.	4/8	100	33	33.0	9	9.0	7	7.0	2	2.0	51	51.0	38.0	
DAC93054.M05	E.F. Salmon R.	4/8	100	42	42.0	6	6.0	4	4.0	1	1.0	53	53.0	37.3	
<i>East Fork B-stock</i>															
DAC93054.M09	E.F. Salmon R.	4/9	100	34	34.0	11	11.0	3	3.0	3	3.0	51	51.0	36.9	
<i>Dworshak B-stock</i>															
DAC93054.M04	Hazard Cr.	4/20	100	66	66.0	7	7.0	3	3.0	0	0.0	76	76.0	23.5	
DAC93054.M06	Hazard Cr.	4/20	100	59	59.0	10	10.0	6	6.0	2	2.0	77	77.0	17.1	
DAC93054.M08	Hazard Cr.	4/21	100	66	66.0	7	7.0	4	4.0	1	1.0	78	78.0	15.5	
Contribution Total			600											386	64.3
<i>Pahsimeroi A-stock</i>															
DAC93054.M10	N.F. Salmon R.	4/16	200	11 1	55.5	17	8.5	10	5.0	3	1.5	141	70.5	21.0	
DAC93054.M11	Salmon R.	4/13	100	55	55.0	10	10.0	4	4.0	0	0.0	69	69.0	24.7	
DAC93054.M13	Lemhi R.	4/14	100	62	62.0	8	8.0	2	2.0	0	0.0	72	72.0	24.5	
DAC93054.M15	Lemhi R.	4/15	100	62	62.0	5	5.0	6	6.0	1	1.0	74	74.0	20.0	
DAC93054.M14	Pahsimeroi weir	4/12	100	48	48.0	6	6.0	2	2.0	1	1.0	57	57.0	24.9	
DAC93054.M16	Pahsimeroi weir	4/12	100	62	62.0	3	3.0	0	0.0	0	0.0	65	65.0	26.0	
Total			700											478	68.3

Magic Valley Hatchery Grand Total**1300****864 66.5**

Table 1. Continued.

				Number / Percent Interrogated								Median Travel Time (Days)		
				GRJ		GOJ		LMJ		MCJ			TOTAL	
File Name	Release Site	Rel. Date	No. Rel.	No.	%	No.	%	No.	%	No.	%	No.	%	
Hagerman National Fish Hatchery Acclimation Study, (Acclimated Group)														
Pahsimeroi A-stock														
DAC93051.H69	Sawtooth weir	4/9	100	49	49.0	8	8.0	3	3.0	0	0.0	60	60.0	36.7
DAC93051.H70	Sawtooth weir	4/9	100	45	45.0	16	16.0	1	1.0	3	3.0	65	65.0	35.6
DAC93051.H71	Sawtooth weir	4/9	100	50	50.0	10	10.0	2	2.0	1	1.0	63	63.0	34.0
Acclimation Total			300									188	62.7	
Acclimation Study, (Non-acclimated Group)														
Pahsimeroi A-stock														
DAC93051.H72	Sawtooth weir	4/9	100	37	37.0	10	10.0	2	2.0	2	2.0	51	51.0	32.9
DAC93051.H73	Sawtooth weir	4/9	100	43	43.0	4	4.0	4	4.0	1	1.0	52	52.0	36.3
DAC93051.H74	Sawtooth weir	4/9	100	45	45.0	7	7.0	4	4.0	2	2.0	58	58.0	31.3
Control Total			300									161	53.7	
Hagerman NFH Grand Total			600											
Clearwater Fish Hatchery														
Cover Study														
Dworshak B-stock														
DAC93021.C09	S.F. Clearwater R.	4/13	100	63	63.0	7	7.0	0	0.0	1	1.0	71	71.0	17.4
DAC93021.C10	S.F. Clearwater R.	4/13	100	60	60.0	7	7.0	3	3.0	0	0.0	70	70.0	17.0
DAC93021.C11	S.F. Clearwater R.	4/13	100	68	68.0	6	6.0	0	0.0	1	1.0	75	75.0	20.8
Clearwater Fish Hatchery Grand Total			300									216	72.0	

Table 2. Snake River mean daily in-flow (thousand cubic feet per second) at Lower Granite Dam, Washington, from 1977-1993 during the Peak and Extended chinook salmon smolt migration periods as defined by Petrosky (1991).

Year	Peak (04/15 - 05/05)	Extended (04/20—05/30)
1977	39.1	40.2
1978	85.4	95.8
1979	64.8	89.9
1980	87.5	102.9
1981	76.2	86.7
1982	116.8	131.6
1983	85.6	111.3
1984	121.9	146.1
1985	86.9	87.2
1986	93.4	105.7
1987	59.0	62.4
1988	55.1	64.2
1989	93.6	87.2
1990	63.8	66.4
1991	44.0	70.5
1992	54.2	57.3
1993	69.8	114.0

Table 3. Estimated number of LSRCP steelhead that returned to Idaho in 1992-1993. The adult return in 1992-1993 included fish from three age classes. Steelhead were reared at Hagerman National and Magic Valley fish hatcheries. These estimates were prepared by the Idaho Department of Fish and Game's Harvest Monitoring Project and only include steelhead harvested in Idaho's sport fisheries, steelhead that returned to hatchery racks, and steelhead that escaped to spawn naturally. These are minimum estimates and do not include all tributary and mainstem strays or in-river pre-spawning mortalities.

HATCHERY	BROOD YEAR	3-OCEAN	2-OCEAN	1-OCEAN
Hagerman	1988	70	---	---
Hagerman	1989	---	1,974	---
Hagerman	1990	---	---	3,545
Estimated Return				5,589
Magic Valley	1988	0	---	---
Magic Valley	1989	---	2,506	---
Magic Valley	1990	---	---	3,499
Estimated Return				6,005

Grand Total

11,594

Table 4. Steelhead smolts released from Magic Valley and Hagerman National fish hatcheries that contributed to the 1992-1993 Idaho steelhead return. The number of steelhead smolts released and the estimated number of adults that returned were compared to facility design production targets and projected adult return goals.

Releases Contributing to 1992-1993 Adult Returns					1992-93
Brood Year	Fish Hatchery	Number Released	Design Target	Percent of Target	Adult Returns
1988	Magic Valley	2,201,994	2,000,000	110%	0
1988	Hagerman NFH	1,472,623	2,400,000	61%	70
	Total	3,674,617	4,400,000	84%	70
1989	Magic Valley	2,122,900	2,000,000	106%	2,506
1989	Hagerman NFH	1,439,266	2,400,000	60%	1,974
	Total	3,562,166	4,400,000	81%	4,480
1990	Magic Valley	2,062,000	2,000,000	103%	3,499
1990	Hagerman NFH	1,436,910	2,400,000	60%	3,545
	Total	3,498,910	4,400,000	80%	7,044
	Mean annual release as percent of target:			82%	
			Total adult return^a:		11,594
			Adult return goal:		25,260
			Percent of goal achieved:		46%

^a Estimate includes only steelhead harvested in Idaho's sport fisheries, steelhead that returned to hatchery racks, and off-site escapement. These are minimum estimates and do not include all tributary and mainstem strays or in-river pre-spawning mortalities.

Table 5. Summary of the 1993 A-strain steelhead trout return to the Sawtooth Fish Hatchery weir. The fish return included fish of hatchery and natural origin. Hatchery aging criteria, based on length, were used to determine age^a. ND indicates No data (i.e., data were not available).

HATCHERY ORIGIN n = 1584										
Age^b	Males n = 1151					Females n = 433				
	Trapped	Released	Spawned	Morts	Other	Trapped	Released	Spawned	Morts	Other
1-ocean	1010	ND	ND	0	ND	331	ND	ND	0	ND
2-ocean	141	ND	ND	0	ND	102	ND	ND	0	ND
Total	1151	487 ^c	530	0	134 ^d	433	174 ^c	255	0	4 ^d

NATURAL ORIGIN n = 7										
Age^b	Males n = 3					Females n = 4				
	Trapped	Released	Spawned	Morts	Other	Trapped	Released	Spawned	Morts	Other
1-ocean	0	0	0	0	0	1	1	0	0	0
2-ocean	3	3	0	0	0	3	3	0	0	0
Total	3	3 ^c	0	0	0	4	4 ^c	0	0	0

Total number trapped	1,591	Green egg number	1,131,877
Trapping period	3/18 - 5/12/93	Eyed egg number	1,031,635 (91.1% eye-up)

^a Fish were aged using the following aging criteria:

<u>RUN</u>	<u>SEX</u>	<u>LENGTH</u>	<u>AGE (years in ocean)</u>
A	male	≤ 68 cm	1-ocean
A	male	> 68 cm	2-ocean
A	female	≤ 65 cm	1-ocean
A	female	> 65 cm	2-ocean

^b Hatchery fish classified as 1-ocean were released in 1991, brood year 1990. Hatchery fish classified as 2-ocean were released in 1990, brood year 1989.

^c Fish were released above the weir.

^d Fish were killed, but the eggs and milt were not used.

Table 6. Summary of the 1993 B-strain steelhead trout return to the East Fork Salmon River weir. The fish return included fish of hatchery and natural origin. Hatchery aging criteria, based on length, were used to determine age^a. ND indicates “no data” (i.e., data were not available).

HATCHERY ORIGIN n = 159										
Age^b	Males n = 91					Females n = 68				
	Trapped	Released	Spawned	Morts	Other	Trapped	Released	Spawned	Morts	Other
1-ocean	57	ND	ND	0	0	2	ND	ND	0	0
2, 3-ocean	34	ND	ND	0	0	66	ND	ND	0	0
Total	91	34^c	57	0	0	68	22^c	46	0	0

NATURAL ORIGIN n = 17										
Age^b	Males n = 8					Females n = 9				
	Trapped	Released	Spawned	Morts	Other	Trapped	Released	Spawned	Morts	Other
1-ocean	5	5	0	0	0	1	1	0	0	0
2, 3-ocean	3	3	0	0	0	8	8	0	0	0
Total	8	8^c	0	0	0	9	9^c	0	0	0

Total number trapped	176	Green egg number	211,993
Trapping period	3/30 - 5/12/93	Eyed egg number	178,925 (84.4% eye-up)

^a Fish were aged using the following aging criteria:

<u>RUN</u>	<u>SEX</u>	<u>LENGTH</u>	<u>AGE (years in ocean)</u>
B	male	≤ 73 cm	1-ocean
B	male	> 73 cm	2- or 3-ocean
B	female	≤ 68 cm	1-ocean
B	female	> 68 cm	2- or 3-ocean

^b Hatchery fish classified as 1-ocean were released in 1991, brood year 1990. Hatchery fish classified as 2- or 3-ocean were released 1990 and 1989, respectively, (brood years 1989 and 1988, respectively).

^c Fish were released above the weir.

Table 7. Smolt-to-adult return rates of coded-wire tagged steelhead smolts released from Hagerman National and Magic Valley fish hatcheries. The number of adults was estimated by Ball (1996) and only include steelhead harvested in Idaho's sport fisheries, steelhead that returned to hatchery racks, and steelhead that escaped to spawn naturally. These are minimum estimates and do not include all tributary and mainstem strays or in-river pre-spawning mortalities.

HATCHERY	STOCK	BROOD	RELEASE SITE	NUMBER CWT	NUMBER ADULTS	SAR (%)
Hagerman	DWOR B	1988	E.F. Salmon R.	43,569	23	0.05
Hagerman	SAW A	1989	Sawtooth FH	45,297	289	0.64
Hagerman	SAW A	1989	Salmon R.	45,828	144	0.31
Magic	E.F. B	1988	E.F. Salmon R.	44,064	42	0.10
Magic	PAH A	1989	Sawtooth FH.	39,620	123	0.31

Table 8. Total number^a of steelhead recovered with coded-wire tags designating them as either large size^b or regular size^c. Recovered fish were released as smolts at the Sawtooth Fish Hatchery weir in 1991 (brood year 1990). ND indicates "no data" (i.e., data were not available).

Size Group	Brood Year	Number CWT	Return Composition				Total Return
			1-Ocean		2-Ocean		
			Male	Female	Male	Female	
Large	1990	53,245	66	36	ND	ND	102
Regular	1990	61,431	41	36	ND	ND	77
Large	1991	53,463	ND	ND	ND	ND	ND
Regular	1991	45,646	ND	ND	ND	ND	ND

^a Includes all Idaho fishery harvest returns, Idaho hatchery returns, and tributary stray recoveries

^b Large size steelhead averaged 241 mm (3.0 fish per pound) at time of release

^c Regular size steelhead averaged 221 mm (4.5 fish per pound) at time of release

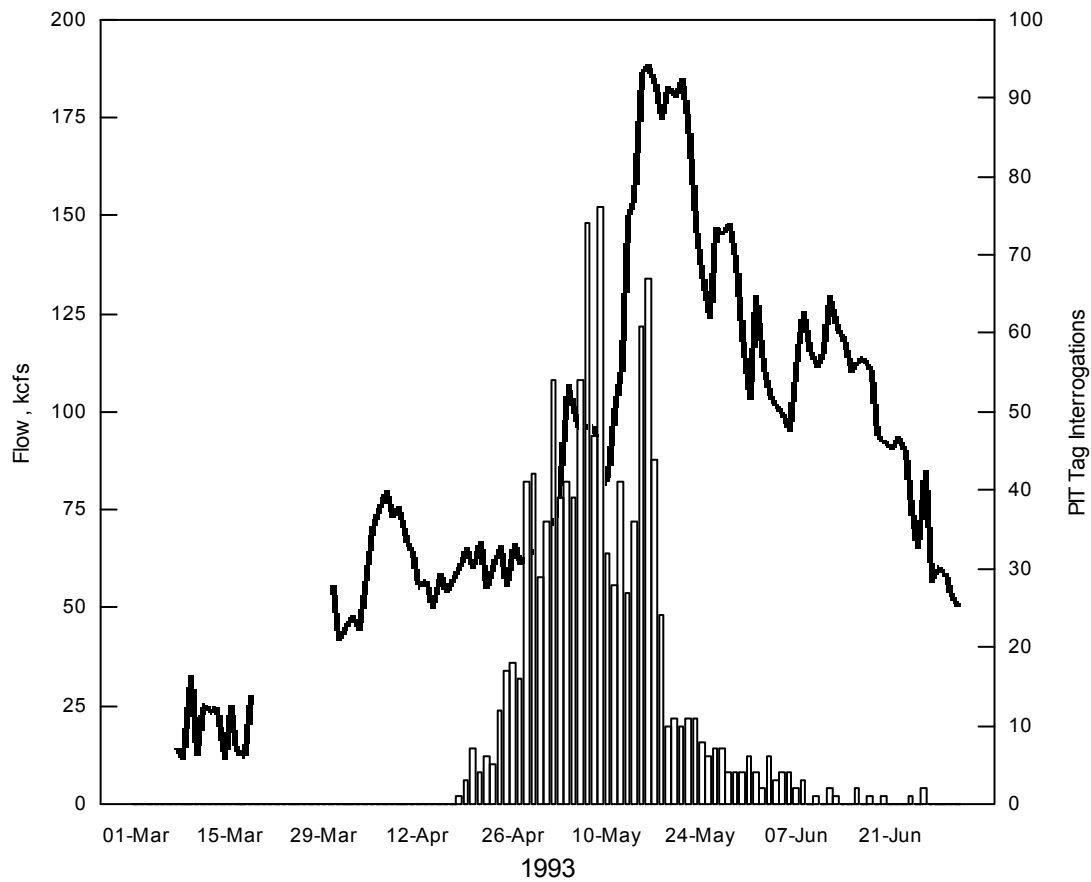


Figure 1. Number of unique PIT tag interrogations of LSRCP juvenile steelhead at Lower Granite Dam, Washington, plotted with the average daily in-flow of the Snake River at Lower Granite Dam in 1993. A total of 2,200 PIT-tagged steelhead smolts were released from Hagerman National, Magic Valley, and Clearwater fish hatcheries between April 8 and April 21, 1993. Fifty-three percent (1,160) of the PIT-tagged fish were interrogated at Lower Granite Dam. Flow data were not available for all dates. Data for one fish falls outside of this date range and is not shown.

APPENDICES

Appendix A. Table 1. Release data and estimated adult returns for Clearwater Fish Hatchery summer steelhead trout, brood year 1992. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Clearwater FH Brood Year: 1992													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
S.F. Clearwater R. Milept. 18 above Stites 4/13/93	9	43,050	DWOR B	CWT/LV/AD *LV/AD	102947	25,673 155	10.1	Shade/Cover Experiment	1	ND	ND	ND	ND
									2	ND	ND	ND	ND
				*AD CLIP *AD/PIT		17,122 100		Experimental Group	3	ND	ND	ND	ND
S.F. Clearwater R. Milept. 18 above Stites 4/13-14/93	11	45,180	DWOR B	CWT/LV/AD *LV/AD	104937	22,003 66	8.9	Shade/Cover Experiment	1	ND	ND	ND	ND
									2	ND	ND	ND	ND
				*AD *AD/PIT		23,011 100		Control Group	3	ND	ND	ND	ND
S.F. Clearwater R. Milept. 18 above Stites 4/13/93	10	38,350	DWOR B	CWT/LV/AD *LV/AD	104938	21,340 64	9.1	Shade/Cover Experiment	1	ND	ND	ND	ND
									2	ND	ND	ND	ND
				*AD *AD/PIT		16,846 100		Experimental Group	3	ND	ND	ND	ND
S.F. Clearwater R. Milept. 18 above Stites 4/12-13/93	ND	199,720	DWOR B	*AD		199,720	9.3	Production					
S.F. Clearwater R. Milept. 18 above Stites Includes all release dates that have mark type indicated by *			DWOR B	NON-CWT (includes all *)		257,284	ND	Production (Includes all *)	1	ND	ND	ND	ND
									2	ND	ND	ND	ND
									3	ND	ND	ND	ND

Appendix A - Table A-1 - Continued													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
			TOTAL CWT RELEASE			69,016							
			TOTAL NON-CWT RELEASE			257,284							
			TOTAL SITE RELEASE			326,300		TOTAL RETURN:		ND	ND	ND	ND
TOTAL CWT RELEASE FOR CLEARWATER FH						69,016							
TOTAL NON-CWT RELEASE FOR CLEARWATER FH						257,284							
TOTAL CLEARWATER FH RELEASE						326,300							
TOTAL PIT TAGS						300							

Appendix A. Table 2. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1992. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman NFH		Brood Year: 1992		Identifying Marks									
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
Hammer Cr. Lower Salmon R. 4/28/93	95	67,581	SAW A	CWT/LV/AD	104946	17,142	4.8	Production	1	ND	ND	ND	ND
				*LV/AD		173			2	ND	ND	ND	ND
				*AD		50,266							
Hammer Cr. Lower Salmon R. 4/28/93	96	77,389	SAW A	CWT/LV/AD	104947	19,655	4.8	Production	1	ND	ND	ND	ND
				*LV/AD		99			2	ND	ND	ND	ND
				*AD		57,635							
Hammer Cr. Lower Salmon R. 4/28/93	97	66,036	SAW A	CWT/LV/AD	104948	16,662	4.8	Production	1	ND	ND	ND	ND
				*LV/AD		515			2	ND	ND	ND	ND
				*AD		48,859							
Hammer Cr. Lower Salmon R. Includes all release dates that have Mark Type indicated by *		157,547	SAW A	NON-CWT		157,547	ND	Production	1	ND	ND	ND	ND
				(includes all *)					(Includes all *)	2	ND	ND	ND
TOTAL CWT RELEASE						53,459							
TOTAL NON-CWT RELEASE						157,547							
TOTAL SITE RELEASE						211,006	TOTAL RETURN:			ND	ND	ND	ND
Sawtooth weir 4/9/93	74	19,229	PAH A	CWT/LV/AD	104949	19,196	4.9	Acclimation Control Group Trucked to SAWT on 4/9/93	1	ND	ND	ND	ND
				CWT/LV/AD/PIT		(100)			2	ND	ND	ND	ND
				*AD		33							
Sawtooth weir 4/9/93	73	18,251	PAH A	CWT/LV/AD	104950	18,168	4.7	Acclimation Control Group Trucked to	1	ND	ND	ND	ND
	74			CWT/LV/AD/PIT *LV/AD	104950	(100) 51			2	ND	ND	ND	ND

*AD

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SAWT on 4/9/93

Appendix A. Table 2. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
Sawtooth weir 4/9/93	72	17,899	PAH A	CWT/LV/AD	104951	17,818	4.9	Acclimation	1	ND	ND	ND	ND
	73			CWT/LV/AD/PIT	104951	(100)		Control Group	2	ND	ND	ND	ND
				*LV/AD *AD		50 31		Trucked to SAWT on 4/9/93					
Sawtooth weir 4/9/93	72	4,571	PAH A	CWT/LV/AD	105034	4,563	4.9	Acclimation	1	ND	ND	ND	ND
				*AD		8		Control Group Trucked to SAWT on 4/9/93	2	ND	ND	ND	ND
Sawtooth weir 4/8/93	69	207,592	PAH A	CWT/LV/AD	105020	20,262	5.1	Acclimation	1	ND	ND	ND	ND
				*LV/AD		246		Experimental Group	2	ND	ND	ND	ND
				*AD *PIT		187,084 (100)		Trucked to SAWT on 3/18- 24/93					
Sawtooth weir 4/8/93	69	191,791	PAH A	CWT/LV/AD	105021	18,726	4.8	Acclimation	1	ND	ND	ND	ND
	70			*LV/AD		164		Experimental Group	2	ND	ND	ND	ND
				*AD		172,901		Trucked to SAWT on 3/18- 24/93					
Sawtooth weir 4/8/93	70	186,674	PAH A	CWT/LV/AD	105022	18,235	5	Acclimation	1	ND	ND	ND	ND
	71			*LV/AD		71		Experimental Group	2	ND	ND	ND	ND
				*AD *PIT		168,368 (100)		Trucked to SAWT on 3/18- 24/93					
Sawtooth weir 4/8/93	71	83,513	PAH A	CWT/LV/AD	105010	8,161	5.1	Acclimation	1	ND	ND	ND	ND
				*AD		75,352		Experimental Group	2	ND	ND	ND	ND
				*PIT		(100)		Trucked to SAWT on 3/18- 24/93					

Appendix A. Table 2. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
Sawtooth weir 4/19/93&4/22/93	85- 91	140,626	SAW A	*AD		(140,626)	ND	Production					
Sawtooth Weir Includes all release dates that have Mark Type indicated by *			SAW A PAH A	NON-CWT (Includes all *)	140,626 463,765	604,391	ND	Production (Includes all *)	1 2	ND ND	ND ND	ND ND	ND ND
			TOTAL CWT RELEASE			125,129							
			TOTAL NON-CWT RELEASE			604,391							
			TOTAL SITE RELEASE			729,520		TOTAL RETURN:					
Hazard Cr. L. Salmon R. 4/12/93	45	219,946	SAW A	CWT/LV/AD *LV/AD *AD	105017	20,045 340 199,561	5	Production	1 2	ND ND	ND ND	ND ND	ND ND
Hazard Cr. L. Salmon R. 4/12/93	45 46	112,344	SAW A	CWT/LV/AD *LV/AD *AD	105018	10,245 103 101,996	5	Production	1 2	ND ND	ND ND	ND ND	ND ND
Hazard Cr. L. Salmon R. 4/12/93	46	215,026	SAW A	CWT/LV/AD *LV/AD *AD	105019	19,621 65 195,340	4.8	Production	1 2	ND ND	ND ND	ND ND	ND ND
Hazard Cr. L. Salmon R. Includes all release dates that have Mark Type indicated by *			SAW A	NON-CWT (Includes all *)		497,405	ND	Production (Includes all *)	1 2	ND ND	ND ND	ND ND	ND ND
			TOTAL CWT RELEASE			49,911							
			TOTAL NON-CWT RELEASE			497,405							
			TOTAL SITE RELEASE			547,316		TOTAL RETURN:		ND	ND	ND	ND
TOTAL SAW A-STOCK CWT RELEASE						103,370							
TOTAL SAW A-STOCK NON-CWT RELEASE						795,578							
TOTAL SAW A-STOCK RELEASE						898,948							

Appendix A. Table 2. Continued.

Appendix A: Table 2: Continued:

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
TOTAL PAH A-STOCK CWT RELEASE						125,129							
TOTAL PAH A-STOCK NON-CWT RELEASE						463,765							
TOTAL PAH A-STOCK RELEASE						588,894							
TOTAL CWT RELEASE FOR HAGERMAN HATCHERY						228,499							
TOTAL NON-CWT RELEASE FOR HAGERMAN HATCHERY						1,259,343							
TOTAL HAGERMAN HATCHERY RELEASE						1,487,842							
TOTAL PIT TAGS						600							

Appendix A. Table 3. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1992. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Magic Valley FH		Brood Year: 1992		Identifying Marks										
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
										Harvest	Hatchery			
E.F. Salmon R. 4/7-8/93	1	212,881	DWOR B	CWT/LV/AD	105007	18,924	6.6	Contribution	1	ND	ND	ND	ND	
				*LV/AD		792		2	ND	ND	ND	ND		
				*LV/AD/PIT		100		3	ND	ND	ND	ND		
				*AD		193,065								
E.F. Salmon R. 4/7-8/93	5	178,119	DWOR B	CWT/LV/AD	105005	16,024	6.9	Contribution	1	ND	ND	ND	ND	
				*LV/AD		62		2	ND	ND	ND	ND		
				*LV/AD/PIT		100		3	ND	ND	ND	ND		
				*AD		161,933								
E.F. Salmon R. 4/7-9/93	9	106,400	E FK B	CWT/LV/AD	105009	19,128	6.1	Contribution	1	ND	ND	ND	ND	
				*LV/AD		1,406		2	ND	ND	ND	ND		
				*LV/AD/PIT		100		3	ND	ND	ND	ND		
				*AD		85,766								
E.F. Salmon R. 4/7-9/93		443,324	DWOR B E FK B	NON-CWT (Includes all *)	356,052 87,272	443,324	ND	Production (Includes all *)	1	ND	ND	ND	ND	
									2	ND	ND	ND	ND	
									3	ND	ND	ND	ND	
								TOTAL CWT RELEASE		54,076				
TOTAL NON-CWT RELEASE		443,324												
TOTAL SITE RELEASE		497,400	TOTAL RETURN:		ND	ND	ND	ND						
Hazard Cr. L. Salmon R. 4/19-20/93	4	109,900	DWOR B	CWT/LV/AD	105004	19,358	4.7	Contribution	1	ND	ND	ND	ND	
				*LV/AD		1,583		2	ND	ND	ND	ND		
				*LV/AD/PIT		100		3	ND	ND	ND	ND		
				*AD		88,859								

Appendix A. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)			
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery					
Hazard Cr. L. Salmon R. 4/16/93	6	126,500	DWOR B	CWT/LV/AD	105006	19,932	6.9	Contribution	1	ND	ND	ND	ND			
				*LV/AD		1,016			2	ND	ND	ND	ND			
				*LV/AD/PIT		100			3	ND	ND	ND	ND			
Hazard Cr. L. Salmon R. 4/16-19/93	8	88,900	DWOR B	CWT/LV/AD	105008	19,909	6.6	Contribution	1	ND	ND	ND	ND			
				*LV/AD		1,081			2	ND	ND	ND	ND			
				*LV/AD/PIT		100			3	ND	ND	ND	ND			
Hazard Cr. L. Salmon R. 4/16-20/93		266,101	DWOR B	NON-CWT (Includes all *)		180,558	ND	Production (Includes all *)	1	ND	ND	ND	ND			
									2	ND	ND	ND	ND			
									3	ND	ND	ND	ND			
TOTAL CWT RELEASE						59,199										
TOTAL NON-CWT RELEASE						266,101										
TOTAL SITE RELEASE						325,300	TOTAL RETURN:			ND	ND	ND	ND			
Lemhi R. 4/14/93	13	66,700	PAH A	CWT/LV/AD	105013	19,692	5.7	Contribution	1	ND	ND	ND	ND			
				*LV/AD		1,046			2	ND	ND	ND	ND			
				*LV/AD/PIT		100										
Lemhi R. 4/14-16/93	15	131,800	PAH A	CWT/LV/AD	105015	21,390	5.9	Contribution	1	ND	ND	ND	ND			
				CWT/LV/AD		22,106			2	ND	ND	ND	ND			
				*LV/AD		118										
Lemhi R. 4/14-16/93		135,312	PAH A	*LV/AD/PIT		100										
				*AD		88,086										
				NON-CWT (Includes all *)		135,312	ND	Production (Includes all *)	1	ND	ND	ND	ND			
TOTAL CWT RELEASE						63,188										
TOTAL NON-CWT RELEASE						135,312										
TOTAL SITE RELEASE						198,500	TOTAL RETURN:			ND	ND	ND	ND			

N.F. Salmon R. 4/16-22/93	10	190,500	PAH A	CWT/LV/AD *LV/AD *LV/AD/PIT *AD	104924	65,637 935 200 123,728	5.4	Contribution	1 2	ND ND	ND ND	ND ND	ND ND
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Appendix A. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
										Harvest	Hatchery		
N.F. Salmon R. 4/16-22/93		124,863	PAH A	NON-CWT (Includes all *)		124,863	ND	Production (Includes all *)	1 2	ND ND	ND ND	ND ND	ND ND
			TOTAL CWT RELEASE			65,637							
			TOTAL NON-CWT RELEASE			124,863							
			TOTAL SITE RELEASE			190,500		TOTAL RETURN:		ND	ND	ND	ND
Upper Salmon R. Ellis Bridge 4/12-13/93	16	122,300	PAH A	CWT/LV/AD *LV/AD *LV/AD/PIT *AD	105016	20,361 210 100 101,629	5.5	Contribution	1 2	ND ND	ND ND	ND ND	ND ND
Upper Salmon R. Ellis Bridge 4/12/93	14	144,000	PAH A	CWT/LV/AD *LV/AD *LV/AD/PIT *AD	105014	19,778 1,051 100 123,071	5.5	Contribution	1 2	ND ND	ND ND	ND ND	ND ND
Upper Salmon R. Ellis Bridge 4/12/93		226,161	PAH A	NON-CWT (Includes all *)		226,161	ND	Production (Includes all *)	1 2	ND ND	ND ND	ND ND	ND ND
			TOTAL CWT RELEASE			40,139							
			TOTAL NON-CWT RELEASE			226,161							
			TOTAL SITE RELEASE			266,300		TOTAL RETURN:		ND	ND	ND	ND
Salmon R. at Challis 4/13/93	11	260,600	PAH A	CWT/LV/AD *LV/AD *LV/AD/PIT *AD	105011	19,924 883 100 239,693	5.9	Contribution	1 2	ND ND	ND ND	ND ND	ND ND
Salmon R. at Challis 4/13/93		240,676	PAH A	NON-CWT includes all *		240,676	ND	Production (Includes all *)	1 2	ND ND	ND ND	ND ND	ND ND

					TOTAL CWT RELEASE	19,924						
					TOTAL NON-CWT RELEASE	240,676						
					TOTAL SITE RELEASE	260,600	TOTAL RETURN:		ND	ND	ND	ND
Slate Cr.	2	187,100	DWOR B	*AD	187,100	6.1	Production	1	ND	ND	ND	ND

Appendix A. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks			Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code						Harvest	Hatchery		
Upper Salmon R. 4/15/93	3									2 3	ND ND	ND ND	ND ND	ND ND
					TOTAL CWT RELEASE	0								
					TOTAL NON-CWT RELEASE	187,100								
					TOTAL SITE RELEASE	187,100	TOTAL RETURN:				ND	ND	ND	ND
					TOTAL DWOR B-STOCK CWT RELEASE	94,147								
					TOTAL DWOR B-STOCK NON-CWT RELEASE	809,253								
					TOTAL DWOR B-STOCK RELEASE	903,400								
					TOTAL PAH A-STOCK CWT RELEASE	188,888								
					TOTAL PAH A-STOCK NON-CWT RELEASE	727,012								
					TOTAL PAH A-STOCK RELEASE	915,900								
					TOTAL E FK B-STOCK CWT RELEASE	19,128								
					TOTAL E FK B-STOCK NON-CWT RELEASE	87,272								
					TOTAL E FK B-STOCK RELEASE	106,400								
					TOTAL CWT RELEASE FOR MAGIC VALLEY FH	302,163								
					TOTAL NON-CWT RELEASE FOR MAGIC VALLEY FH	1,623,537								
					TOTAL MAGIC VALLEY FH RELEASE	1,925,700								
					TOTAL PIT TAGS	1,300								

Appendix B. Table 1. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1988. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman NFH		Brood Year: 1988											
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks					Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose		Harvest	Hatchery		
Sawtooth Weir 4/11-13/89	ND	ND	SAW A	CWT/LV/AD	104138	14,718	4.9	Contribution	1 2	4 6	0 2	12	0.08
Sawtooth Weir 4/11-13/89	ND	ND	SAW A	CWT/LV/AD	104139	14,585	4.9	Contribution	1 2	0 10	0 3	13	0.09
Sawtooth Weir 4/11-13/89	ND	ND	SAW A	CWT/LV/AD	104140	16,914	4.9	Contribution	1 2	5 0	1 0	6	0.04
Sawtooth Weir 4/11-13/89	ND	ND	SAW A	AD		590,334	4.9	Production	1 2	288 435	86 102	911	0.15
			TOTAL CWT RELEASE			46,217							
			TOTAL NON-CWT RELEASE			590,334							
			TOTAL SITE RELEASE			636,551							
								TOTAL RETURN:		748	194	942	0.15
East Fork Salmon R. at trap 4/17-19/89	ND	ND	DWOR B	CWT/LV/AD	104132	14,939	5	Contribution	1 2 3	0 4 0	0 0 0	4	0.03
East Fork Salmon R. at trap 4/17-19/89	ND	ND	DWOR B	CWT/LV/AD	104133	14,911	5	Contribution	1 2 3	0 2 7	0 1 0	10	0.07
East Fork Salmon R. at trap	ND	ND	DWOR B	CWT/LV/AD	104134	13,719	5	Contribution	1	1	1	9	0.07

4/17-19/89									2	7	0		
									3	0	0		
East Fork Salmon R. at trap	ND	ND	DWOR B	AD		393,007	5	Production	1	24	18	426	0.11
4/17-19/89									2	300	21		
									3	63	0		
Appendix B. Table 1. Continued.													

Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
										Harvest	Hatchery		
East Fork Salmon R. at trap 4/17-19/89													
			TOTAL CWT RELEASE			43,569							
			TOTAL NON-CWT RELEASE			393,007							
			TOTAL SITE RELEASE			436,576		TOTAL RETURN:		408	41	449	0.10
Clear Cr. at Kooskia NFH 5/8/89	ND	ND	DWOR B	CWT/LV/AD	104135	15,294	5	Contribution	1	ND	ND	ND	ND
									2	ND	ND		
									3	ND	ND		
Clear Cr. at Kooskia NFH 5/8/89	ND	ND	DWOR B	CWT/LV/AD	104136	15,482	5	Contribution	1	ND	ND	ND	ND
									2	ND	ND		
									3	ND	ND		
Clear Cr. at Kooskia NFH 5/8/89	ND	ND	DWOR B	CWT/LV/AD	104137	14,374	5	Contribution	1	ND	ND	ND	ND
									2	ND	ND		
									3	ND	ND		
Clear Cr. at Kooskia NFH 5/8/89	ND	ND	DWOR B	AD		3,997	5	Production	1	ND	ND	ND	ND
									2	ND	ND		
									3	ND	ND		
			TOTAL CWT RELEASE			45,150							
			TOTAL NON-CWT RELEASE			3,997							
			TOTAL SITE RELEASE			49,147		TOTAL RETURN:		ND	ND	ND	ND
S. Fork Clearwater R. Crooked R. Bridge 4/24/89	ND	ND	DWOR B	AD		83,431	5	Production	1	ND	ND	ND	ND
									2	ND	ND		
									3	ND	ND		
			TOTAL CWT RELEASE			0							
			TOTAL NON-CWT RELEASE			83,431							
			TOTAL SITE RELEASE			83,431		TOTAL RETURN:		ND	ND	ND	ND

S. Fork Clearwater R., Mill Cr. Bridge Mill Cr. Bridge 4/26/89	ND	ND	DWOR B	AD		60,372	5	Production	1	ND	ND	ND	ND
									2	ND	ND		
									3	ND	ND		

Appendix B. Table 1. Continued.

Release Site/Date	RW NO.	RW Total	Identifying Marks							Age Ocean	Return		Total Returns	SAR (%)
			Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Composition					
									Harvest		Hatchery			
			TOTAL CWT RELEASE			0								
			TOTAL NON-CWT RELEASE			60,372								
			TOTAL SITE RELEASE			60,372		TOTAL RETURN:		ND	ND	ND	ND	
S. Fork Clearwater R.	ND	ND	DWOR B	AD		103,273	5	Production	1	ND	ND	ND	ND	
Newsome Cr. Bridge, (town bridge)									2	ND	ND			
4/26,5/1/89									3	ND	ND			
			TOTAL CWT RELEASE			0								
			TOTAL NON-CWT RELEASE			103,273								
			TOTAL SITE RELEASE			103,273		TOTAL RETURN:		ND	ND	ND	ND	
S. Fork Clearwater R.	ND	ND	DWOR B	AD		103,273	5	Production	1	ND	ND	ND	ND	
Eldorado Cr. 2nd Bridge, 5/1,3/89									2	ND	ND			
									3	ND	ND			
			TOTAL CWT RELEASE			0								
			TOTAL NON-CWT RELEASE			103,273								
			TOTAL SITE RELEASE			103,273		TOTAL RETURN:		ND	ND	ND	ND	
TOTAL SAW A-STOCK CWT RELEASE						46,217		RETURN IS COMPLETE						
TOTAL SAW A-STOCK NON-CWT RELEASE						590,334								
TOTAL SAW A-STOCK RELEASE						636,551								
TOTAL DWOR B-STOCK CWT RELEASE						88,719		* RETURN						
TOTAL DWOR B-STOCK NON-CWT RELEASE						747,353		GRAND TOTAL:						
TOTAL DWOR B-STOCK RELEASE						836,072		1,156 235 1,391 0.09						
								* includes S.Fork Clearwater Releases						
								** RETURN						
TOTAL CWT RELEASE FOR HAGERMAN NFH						134,936		GRAND TOTAL:						
								1,156 235 1,391 0.13						

TOTAL NON-CWT RELEASE FOR HAGERMAN NFH
TOTAL HAGERMAN NFH RELEASE

1,337,687
1,472,623

**excluding S. Fork Clearwater Release

Appendix B. Table 2. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1989. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman NFH		Brood Year: 1989												
				Identifying Marks										
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
										Harvest	Hatchery			
Sawtooth Weir 4/5/90	70 71	99,878	SAW A	CWT/LV/AD *LV/AD *AD	104214	14,597 147 85,134	4.7	Contribution	1 2	76 12	19 6	113	0.77	
Sawtooth Weir 4/5/90	70 71	100,772	SAW A	CWT/LV/AD *LV/AD *AD	104215	15,482 156 85,134	4.7	Contribution	1 2	48 33	12 5	98	0.63	
Sawtooth Weir 4/5/90	70 71	100,506	SAW A	CWT/LV/AD *LV/AD *AD	104216	15,218 154 85,134	4.7	Contribution	1 2	60 3	15 0	78	0.51	
Sawtooth Weir Includes all release dates that have Mark Type indicated by *			SAW A	NON-CWT (Includes all *)		255,859	4.7	Production (Includes all *)	1 2	2,072 314	518 44	2,948	1.15	
			TOTAL CWT RELEASE				45,297							
			TOTAL NON-CWT RELEASE				255,859							
			TOTAL SITE RELEASE				301,156		TOTAL RETURN:		2,618	619	3,237	1.07
Salmon R. at Shoup Bridge 4/12/90	92	67,001	SAW A	CWT/LV/AD	104227	15,528	5	Contribution	1	24	17	41	0.26	
	93			*AD		51,473			2	0	0			
Salmon R. at Shoup Bridge 4/12/90	92	66,669	SAW A	CWT/LV/AD	104228	15,196	5	Contribution	1	30	23	61	0.40	
	93			*AD		51,473			2	8	0			

Appendix B. Table 2. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks				Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)			Harvest	Hatchery		
Salmon R. at Shoup Bridge 4/12/90	92	66,576	SAW A	CWT/LV/AD	104229	15,104	5	Contribution	1	19	14	42	0.28
	93			*AD		51,472			2	9	0		
Salmon R. at Shoup Bridge	92		SAW A	NON-CWT		154,418	5	Production	1	179	119	355	0.23
Includes all release dates that have Mark Type indicated by *	93			(Includes all *)				(Includes all *)	2	57	0		
TOTAL CWT RELEASE						45,828							
TOTAL NON-CWT RELEASE						154,418							
TOTAL SITE RELEASE						200,246		TOTAL RETURN:		326	173	499	0.25
Little Salmon R. at Hazard Cr. 4/30/90	48	131,854	DWOR B	CWT/LV/AD	104230	14,841	4.4	Contribution	1	0	0	516	3.48
	49			*LV/AD		49			2	258	258		
				*AD		116,964			3	ND	ND		
Little Salmon R. at Hazard Cr. 4/30/90	48	131,075	DWOR B	CWT/LV/AD	104231	14,065	4.4	Contribution	1	0	0	8	0.06
	49			*LV/AD		47			2	4	4		
				*AD		116,963			3	ND	ND		
Little Salmon R. at Hazard Cr. 4/30/90	49	130,423	DWOR B	CWT/LV/AD	104232	13,416	4.4	Contribution	1	0	0	18	0.13
				*LV/AD		44			2	9	9		
				*AD		116,963			3	ND	ND		
Little Salmon R. at Hazard Cr. 4/23/90	ND	ND	SAW A	*AD		80,465	4.2	Production	1	33	33	126	0.16
									2	30	30		
Little Salmon R. at Hazard Cr.	ND		DWOR B	NON-CWT		351,030	4.4	Production	1	0	0	332	0.09
Includes all release dates that have Mark Type indicated by *				(Includes all *)				(Includes all *)	2	166	166		
									3	ND	ND		
TOTAL CWT RELEASE						42,322							
TOTAL NON-CWT RELEASE						431,495							
TOTAL SITE RELEASE						473,817		TOTAL RETURN:		500	500	1,000	0.21

Appendix B. Table 2. Continued.

Appendix B: Table 2: Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
Salmon R. at Ellis Bridge 4/9-11/90	ND	ND	SAW A	*AD		200,295	4.4	Production	1	252	168	700	0.35
									2	256	24		
			TOTAL CWT RELEASE			0							
			TOTAL NON-CWT RELEASE			200,295							
			TOTAL SITE RELEASE			200,295		TOTAL RETURN:		508	192	700	
Salmon R. at N.Fk Ramp 4/18-20/90	ND	ND	SAW A	*AD		199,602	4.3	Production	1	251	167	677	0.34
									2	250	9		
			TOTAL CWT RELEASE			0							
			TOTAL NON-CWT RELEASE			199,602							
			TOTAL SITE RELEASE			199,602		TOTAL RETURN:		501	176	677	0.34
East Fork Salmon R. 4/11/90	ND	ND	DWOR B	*AD		64,150	3.8	Production	1	3	0	13	
									2	9	1		
									3	ND	ND		
			TOTAL CWT RELEASE			0							
			TOTAL NON-CWT RELEASE			64,150							
			TOTAL SITE RELEASE					TOTAL RETURN:		12	1	13	0.02
TOTAL SAW A-STOCK CWT RELEASE						91,125							
TOTAL SAW A-STOCK NON-CWT RELEASE						890,639							
TOTAL SAW A-STOCK RELEASE						981,764		RETURN IS INCOMPLETE					
TOTAL DWOR B-STOCK CWT RELEASE						42,322		RETURN					
TOTAL DWOR B-STOCK NON-CWT RELEASE						415,180		GRAND TOTAL:		4,465	1,661	6,126	0.43
TOTAL DWOR B-STOCK RELEASE						457,502							
TOTAL CWT RELEASE FOR HAGERMAN NFH						133,447							
TOTAL NON-CWT RELEASE FOR HAGERMAN NFH						1,305,819							
TOTAL HAGERMAN NFH RELEASE						1,439,266							

Appendix B. Table 3. Release data and estimated adult returns for Hagerman National Fish Hatchery summer steelhead trout, brood year 1990. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Hagerman		Brood Year: 1990		Identifying Marks					Age Ocean	Return Composition		Total Returns	SAR (%)
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose		Harvest	Hatchery		
Sawtooth Weir 4/13/91	71- 74	22,652	SAW A	CWT/LV/AD	104333	21,050	2.9	Size at release	1	45	24	69	0.33
				*LV/AD *AD		213 1,389		Large size group	2	ND	ND		
Sawtooth Weir 4/13/91	71- 74	21,580	SAW A	CWT/LV/AD	104334	20,129	2.9	Size at release	1	55	27	82	0.41
				*LV/AD *AD		122 1,329		Large size group	2	ND	ND		
Sawtooth Weir 4/15/91	74- 75	12,864	SAW A	CWT/LV/AD	104335	12,066	2.6	Size at release	1	32	12	44	0.36
				*AD		798		Large size group	2	ND	ND		
Sawtooth Weir 4/13/91	76- 78	326,644	SAW A	CWT/LV/AD	104336	21,775	4.5	Size at release	1	55	13	68	0.31
				*LV/AD *AD		131 304,738		Regular size group	2	ND	ND		
Sawtooth Weir 4/13/91	76- 78	305,400	SAW A	CWT/LV/AD	104337	20,318	4.5	Size at release	1	49	15	64	0.31
				*LV/AD *AD		143 284,939		Regular size group	2	ND	ND		
Sawtooth Weir 4/16/91	78- 80	290,660	SAW A	CWT/LV/AD	104338	19,338	4.4	Size at release	1	52	19	71	0.37
				*LV/AD *AD		156 271,166		Regular size group	2	ND	ND		
Sawtooth Weir 4/13-16/91	71- 80	985	SAW A	*AD/PIT		985	ND		1	2	1	3	0.30
						(489)		Size at release	2	ND	ND		
						(496)		Size at release (Reg)					

Appendix B. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks					Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose		Harvest	Hatchery		
Sawtooth Weir Includes all release dates that have Mark Type indicated by *		865,124	SAW A	NON-CWT (Includes all *)		865,124	2.9	Production (Includes all *)	1 2	2,173 ND	682 ND	2,855	0.33
Sawtooth Weir 10/5-17/90	ND	ND	SAW A	*AD		304,907	39.6	Fall release	1 2	0 ND	0 ND	0	0.00
			TOTAL CWT RELEASE			114,676							
			TOTAL NON-CWT RELEASE			1,170,031							
			TOTAL SITE RELEASE			1,284,707		TOTAL RETURN:		2,463	793	3,256	0.25
Little Salmon R. at Hazard Cr. 4/22/91	19- 21	154,937	DWOR B	CWT/LV/AD *LV/AD *AD	104332	19,831 384 134,722	4.4	Contribution	1 2 3	6 ND ND	6 ND ND	12	0.06
Little Salmon R. at Hazard Cr. 4/19/91	51	154,379	DWOR B	CWT/LV/AD *LV/AD *AD	104339	19,813 241 134,325	4.4	Contribution	1 2 3	4 ND ND	4 ND ND	8	0.04
Little Salmon R. at Hazard Cr. 4/17/91	38	147,794	DWOR B	CWT/LV/AD *LV/AD *AD	104340	18,877 554 128,363	4.5	Contribution	1 2 3	3 ND ND	3 ND ND	6	0.03
Little Salmon R. at Hazard Cr. 4/24/91	44 45	424	DWOR B	AD/PIT		424	4.5	Contribution	1 2 3	0 ND ND	0 ND ND	0	ND
Little Salmon R. at Hazard Cr. Includes all release dates that have Mark Type indicated by *			DWOR B	NON-CWT (Includes all *)		398,589	4-4.5	Production (Includes all *)	1 2 3	88 ND ND	88 ND ND	176	0.04
			TOTAL CWT RELEASE			58,521							
			TOTAL NON-CWT RELEASE			518,912							
			TOTAL SITE RELEASE			577,433		TOTAL RETURN:		128	128	256	0.04
E. Fk Salmon R. (above trap)	ND		UNK. B	AD		540,733	32.8	Excess Fingerling Plant	1 2	29 ND	4 ND	33	0.01

9/5-7/90

3

ND

ND

Appendix B. Table 3. Continued.

Appendix B: Table B: Continued.															
Identifying Marks															
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)		
										Harvest	Hatchery				
Little Salmon R. at Hazard Cr.	ND		DWOR B	AD		120,323	22.5	Excess Fingerling	1	27	27	54	0.04		
								Plant	2	ND	ND				
									3	ND	ND				
								TOTAL CWT RELEASE			0				
								TOTAL NON-CWT RELEASE			540,733				
TOTAL SITE RELEASE						540,733	TOTAL RETURN:			29	4	33	0.01		
TOTAL SAW A-STOCK CWT RELEASE						114,676	RETURN IS INCOMPLETE								
TOTAL SAW A-STOCK NON-CWT RELEASE						1,170,031									
TOTAL SAW A-STOCK RELEASE						1,284,707									
TOTAL DWOR B-STOCK CWT RELEASE						58,521	RETURN GRAND TOTAL: (includes fingerling and fry releases)								
TOTAL DWOR B-STOCK NON-CWT RELEASE						518,912									
TOTAL DWOR B-STOCK RELEASE						577,433									
TOTAL UNK B-STOCK CWT RELEASE						0									
TOTAL UNK B-STOCK NON-CWT RELEASE						540,733									
TOTAL UNK B-STOCK RELEASE						540,733									
TOTAL CWT RELEASE FOR HAGERMAN NFH						173,197									
TOTAL NON-CWT RELEASE FOR HAGERMAN NFH						2,229,676									
TOTAL HAGERMAN NFH RELEASE						2,402,873									
TOTAL PIT TAGS						1,409									
TOTAL SMOLT RELEASE						1,436,910	RETURN (smolt releases only)		2,564	894	3,458	0.24			

Appendix C. Table 1. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1988. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Magic Valley FH			Brood Year: 1988											
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks			Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code						Harvest	Hatchery		
Sawtooth Weir 4/10-19/89	ND	ND	PAH A	*AD		854,462	4.44	Production	1 2	421 627	126 147	1,321	0.15	
Sawtooth Weir 4/10-19/89	ND	ND	PAH A	*AD/PIT		2,832	4.44	Water budget migration	1 2	1 4	0 1	6	0.21	
			TOTAL CWT RELEASE			0								
			TOTAL NON-CWT RELEASE			857,294								
			TOTAL SITE RELEASE			857,294		TOTAL RETURN:		1,053	274	1,327	0.15	
Hazard Cr. (L. Salmon R.) 4/19-26/89	ND	ND	PAH A	*AD		401,052	4.23	Production	1 2	79 286	79 286	730	0.18	
Hazard Cr. (L. Salmon R.) 4/19-26/89	ND	ND	PAH A	CWT/LV/AD	104141	15,209	4.23	Contribution	1 2	0 15	0 15	30	0.20	
Hazard Cr. (L. Salmon R.) 4/19-26/89	ND	ND	PAH A	CWT/LV/AD	104142	15,154	4.23	Contribution	1 2	3 9	3 9	24	0.16	
Hazard Cr. (L. Salmon R.) 4/19-26/89	ND	ND	PAH A	CWT/LV/AD	104143	15,927	4.23	Contribution	1 2	0 9	0 9	18	0.11	
Hazard Cr. (L. Salmon R.) 4/19-26/89	ND	ND	PAH A	*AD/PIT		3,058	4.23	Contribution	1 2	ND ND	ND ND	0	0.00	

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks			Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
				Mark Type	CWT Code	Release Number								
			TOTAL CWT RELEASE			46,290								
			TOTAL NON-CWT RELEASE			404,110								
			TOTAL SITE RELEASE			450,400		TOTAL RETURN:		401	401	802	0.18	
East Fork Salmon R. 4/15-19/89	ND	ND	E FK B	*AD		306,306	4.48	Production	1	19	14	656	0.21	
									2 3	572 0	51 0			
East Fork Salmon R. 4/15-19/89	ND	ND	E FK B	CWT/LV/AD	104144	15,624	4.48	Contribution	1	3	2	27	0.17	
									2 3	19 0	3 0			
East Fork Salmon R. 4/15-19/89	ND	ND	E FK B	CWT/LV/AD	104145	14,126	4.48	Contribution	1	1	1	5	0.04	
									2 3	3 0	0 0			
East Fork Salmon R. 4/15-19/89	ND	ND	E FK B	CWT/LV/AD	104146	14,314	4.48	Contribution	1	1	1	10	0.07	
									2 3	8 0	0 0			
East Fork Salmon R. 4/15-19/89	ND	ND	E FK B	*AD/PIT		2,930	4.48	Migration survival and timing	1	0	0	7	0.24	
									2 3	6 0	1 0			
			TOTAL CWT RELEASE			44,064								
			TOTAL NON-CWT RELEASE			309,236								
			TOTAL SITE RELEASE			353,300		TOTAL RETURN:		632	73	705	0.20	
Slate Cr. Lower Sal. R. 4/24-27/89	ND	ND	PAH A	*AD		300,600	4.14	Production	1	60	60	549	0.18	
									2	214	215			
			TOTAL CWT RELEASE			0								
			TOTAL NON-CWT RELEASE			300,600								

			TOTAL SITE RELEASE		300,600		TOTAL RETURN:		274	275	549	0.18
Yankee Fork Salmon R. 4/17-21/89	ND	ND	PAH A	*AD	104,400	4.33	Production	1	80	24	199	0.19
								2	77	18		

Appendix C. Table 1. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
						0							
						104,400							
						104,400		TOTAL RETURN:		157	42	199	0.19
Hammer Cr. 4/28-29/89	ND	ND	PAH A	*AD		136,000	4.04	Production	1	27	27	248	0.18
									2	97	97		
						0							
						136,000							
						136,000		TOTAL RETURN:		124	124	248	0.18
						46,290							
						1,802,404							
						1,848,694		RETURN IS COMPLETE					
						44,064		RETURN					
						309,236		GRAND TOTAL:		2,641	1,189	3,830	0.17
						353,300							
						90,354							
						2,111,640							
						2,201,994							
TOTAL PIT TAGS						5,988							

Appendix C. Table 2. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1989. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Magic Valley FH Brood Year: 1989													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
Sawtooth Weir	1	1,159,080	PAH A	CWT/LV/AD/FB	104059	39,620	4.2	Contribution, timing	1	56	14	123	0.31
4/12-13/90				FB = LA-)(-1 *LV/AD *AD		2,804 1,156,276	4.2		2	53	0		
Sawtooth Weir			PAH A	NON-CWT (Includes all *)		1,159,080		Production (Includes all *)	1 2	3,312 1,424	828 198	5,762	0.50
4/12-13/90													
Includes all release dates that have Mark Type indicated by *													
			TOTAL CWT RELEASE			39,620							
			TOTAL NON-CWT RELEASE			1,159,080							
			TOTAL SITE RELEASE			1,198,700		TOTAL RETURN:		4,845	1,040	5,885	0.49
E. F. Salmon R.	10	152,110	E. FK. B	CWT/LV/AD/FB	104058	40,905	4.1	Contribution, timing	1	11	4	96	0.23
4/14/90				FB = RA-)(-1 *LV/AD *AD		837 111,205			2 3	66 ND	15 ND		
E. F. Salmon R.	16	651,914	E. FK. B	CWT/LV/AD	104236	15,474	4.2	Contribution	1	13	0	37	0.24
4/16/90				*LV/AD *AD		366 42,068			2 3	20 ND	4 ND		
E. F. Salmon R.	11	115,013	E. FK. B	CWT/LV/AD	104237	15,971	4.2	Contribution	1	5	1	30	0.19
4/16/90				*LV/AD *AD		378 43,419			2 3	21 ND	3 ND		

Appendix C. Table 2. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
E. F. Salmon R. 4/16/90	11	115,013	E. FK. B	CWT/LV/AD *LV/AD *AD	104238	14,958 354 40,665	4.2	Contribution	1 2 3	0 21 ND	3 3 ND	27	0.18
E. F. Salmon R. 4/16-18/90	16	651,914	DWOR B	CWT/LV/AD *LV/AD *AD	104233	14,964 1,079 183,731	5	Contribution	1 2 3	0 2 ND	0 0 ND	2	0.01
E. F. Salmon R. 4/16-18/90	16	651,914	DWOR B	CWT/LV/AD *LV/AD *AD	104234	15,157 1,093 186,101	5	Contribution	1 2 3	0 58 ND	0 0 ND	58	0.38
E. F. Salmon R. 4/16-18/90	16	651,914	DWOR B	CWT/LV/AD *LV/AD *AD	104235	14,642 1,056 179,777	5	Contribution	1 2 3	2 9 ND	0 1 ND	12	0.08
E. F. Salmon R. 4/14-18/90			DWOR B E. FK. B	NON-CWT (Includes all *)	552,837 239,292	792,129	4.6	Production (Includes all *)	1 2 3	112 535 ND	14 73 ND	734	0.09
Includes all release dates that have Mark Type indicated by *													
TOTAL CWT RELEASE						132,071							
TOTAL NON-CWT RELEASE						792,129							
TOTAL SITE RELEASE						924,200	TOTAL RETURN:			875	121	996	0.11
Slate Cr.	ND	ND	DWOR B	*AD		162,700	60.8	Excess Fingerling Plant	1 2 3	0 0 ND	0 0 ND	0	0
Upper Salmon R. 9/11/89						0							
TOTAL CWT RELEASE						162,700							
TOTAL NON-CWT RELEASE						162,700							
TOTAL SITE RELEASE						162,700	TOTAL RETURN:			0	0	0	0

Appendix C. Table 2. Continued.

Identifying Marks													
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
										Harvest	Hatchery		
TOTAL PAH A-STOCK CWT RELEASE						39,620							
TOTAL PAH A-STOCK NON-CWT RELEASE						1,159,080							
TOTAL PAH A-STOCK RELEASE						1,198,700							
								RETURN IS INCOMPLETE					
TOTAL DWOR B-STOCK CWT RELEASE						44,763							
TOTAL DWOR B-STOCK NON-CWT RELEASE						715,537							
TOTAL DWOR B-STOCK RELEASE						760,300	RETURN GRAND TOTAL: (includes fingerling and fry releases)		5,720	1,161	6,881	0.30	
TOTAL E FK B-STOCK CWT RELEASE						87,308							
TOTAL E FK B-STOCK NON-CWT RELEASE						239,292							
TOTAL E FK B-STOCK RELEASE						326,600							
TOTAL CWT RELEASE FOR MAGIC VALLEY FH						171,691							
TOTAL NON-CWT RELEASE FOR MAGIC VALLEY FH						2,113,909							
TOTAL MAGIC VALLEY FH RELEASE						2,285,600							
TOTAL SMOLT RELEASE						2,122,900	RETURN (smolt releases only)		5,720	1,161	6,881	0.32	

Appendix C. Table 3. Release data and estimated adult returns for Magic Valley Fish Hatchery summer steelhead trout, brood year 1990. An asterisk (*) indicates that the fish were counted in the NON-CWT category for the specified release site. A number enclosed in parentheses indicates that the fish were counted in an above category. Return data were tabulated (if available) for each CWT code and NON-CWT group. Release information is summarized by CWT/NON-CWT and stock at bottom of table. ND indicates data were not available. The harvest component of the return composition includes only fish that were harvested in Idaho's sport fishery. The hatchery component of the return composition includes fish that returned to hatchery weirs and off-site escapement.

Hatchery: Magic Valley FH Brood Year: 1990													
Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
E. F. Salmon R. 4/13/91	3	209,893	DWOR B	CWT/LV/AD	104314	20,498	4.1	Contribution	1	200	1	201	0.98
				*LV/AD		2,027			2	ND	ND		
				*AD		187,368			3	ND	ND		
E. F. Salmon R. 4/13/91	2	214,470	DWOR B	CWT/LV/AD	104315	21,017	4.1	Contribution	1	5	1	6	0.03
				*LV/AD		2,079			2	ND	ND		
				*AD		191,374			3	ND	ND		
E. F. Salmon R. 4/13/91	3	207,987	DWOR B	CWT/LV/AD	104316	20,312	4.1	Contribution	1	0	0	0	0.00
				*LV/AD		2,008			2	ND	ND		
				*AD		185,667			3	ND	ND		
E. F. Salmon R. 4/15-16/91	15	113,570	E. FK. B.	CWT/LV/AD	104320	22,525	4.3	Contribution	1	4	3	7	0.03
				*LV/AD		530			2	ND	ND		
				*AD		90,515			3	ND	ND		
E. F. Salmon R. 4/15-16/91	14	112,609	E. FK. B.	CWT/LV/AD	104321	22,483	4.3	Contribution	1	0	3	3	0.01
				*LV/AD		529			2	ND	ND		
				*AD		89,597			3	ND	ND		
E. F. Salmon R. 4/15-16/91	15	107,771	E. FK. B.	CWT/LV/AD	104322	21,375	4.3	Contribution	1	0	1	1	0.00
				*LV/AD		503			2	ND	ND		
				*AD		85,893			3	ND	ND		
E. F. Salmon R. 4/13, 15-16/91	2	1,500	DWOR B	AD/PIT		1,500		Migration survival and timing	1	0	0	0	0.00
	14		E. FK. B.						2	ND	ND		
									3	ND	ND		

Appendix C. Table 3. Continued.

Release Site/Date	RW NO.	RW Total	Stock ID	Identifying Marks		Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)
				Mark Type	CWT Code					Harvest	Hatchery		
E. F. Salmon R. Includes all release dates that have Mark Type indicated by *			DWOR B E FK B	NON-CWT (Includes all)	570,523 267,567	838,090		Production (Includes all)	1 2 3	337 ND ND	46 ND ND	383	0.05
			TOTAL CWT RELEASE			128,210							
			TOTAL NON-CWT RELEASE			839,590							
			TOTAL SITE RELEASE			967,800		TOTAL RETURN:		546	55	601	0.06
Hazard Cr. L. Salmon R. 4/26/91	8	102,541	PAH A	CWT/LV/AD *LV/AD *AD	104317	21,809 744 79,988	3.6	Contribution	1 2	4 ND	4 ND	8	0.04
Hazard Cr. L. Salmon R. 4/26/91	7 8	105,146	PAH A	CWT/LV/AD *LV/AD *AD	104318	22,704 774 81,668	3.6	Contribution	1 2	21 ND	21 ND	42	0.18
Hazard Cr. L. Salmon R. 4/26/91	8	101,013	PAH A	CWT/LV/AD *LV/AD *AD	104319	21,484 733 78,796	3.6	Contribution	1 2	16 ND	16 ND	32	0.15
Hazard Cr. L. Salmon R. 4/26/91	7 8	1,600	PAH A	AD/PIT		1,600	3.6	Migration survival and timing	1 2	1 ND	1 ND	2	0.13
Hazard Cr. L. Salmon R.			PAH A	NON-CWT (Includes all *)		242,703	3.6	Production (Includes all)	1 2	151 ND	151 ND	302	0.12
Includes all release dates that have Mark Type indicated by *			TOTAL CWT RELEASE			65,997							
			TOTAL NON-CWT RELEASE			244,303							
			TOTAL SITE RELEASE			310,300		TOTAL RETURN:		193	193	386	0.12
Sawtooth Weir 4/9-19/91	ND	ND	PAH A	*AD		364,700	3.9	Production	1 2	916 ND	288 ND	1204	0.33
			TOTAL CWT RELEASE			0							

TOTAL NON-CWT RELEASE	364,700					
TOTAL SITE RELEASE	364,700	TOTAL RETURN:	988	288	1276	0.35

Appendix C. Table 3. Continued.

Identifying Marks														
Release Site/Date	RW NO.	RW Total	Stock ID	Mark Type	CWT Code	Release Number	Size (FPP)	Marking Purpose	Age Ocean	Return Composition		Total Returns	SAR (%)	
										Harvest	Hatchery			
Pahsimeroi R. at hatchery 4/18-19/91	ND	ND	PAH A	*AD		135,100	3.8	Production	1	445	411	856	0.63	
						2			ND	ND				
						TOTAL CWT RELEASE			0					
						TOTAL NON-CWT RELEASE			135,100					
						TOTAL SITE RELEASE			135,100	TOTAL RETURN:				445
Salmon R. at Shoup Br. 4/20-21/91	ND	ND	PAH A	*AD		97,800	3.9	Production	1	214	6	220	0.22	
						2			ND	ND				
						TOTAL CWT RELEASE			0					
						TOTAL NON-CWT RELEASE			97,800					
						TOTAL SITE RELEASE			97,800	TOTAL RETURN:				214
Hammer Cr. 4/22-25/91	ND	ND	PAH A	*AD		186,300	3.9	Production	1	116	116	232	0.12	
						2			ND	ND				
						TOTAL CWT RELEASE			0					
						TOTAL NON-CWT RELEASE			186,300					
						TOTAL SITE RELEASE			186,300	TOTAL RETURN:				116
TOTAL PAH A-STOCK CWT RELEASE						65,997								
TOTAL PAH A-STOCK NON-CWT RELEASE						1,028,203								
TOTAL PAH A-STOCK RELEASE						1,094,200								
TOTAL DWOR B-STOCK CWT RELEASE						61,827								
TOTAL DWOR B-STOCK NON-CWT RELEASE						571,273								
TOTAL DWOR B-STOCK RELEASE						633,100								
TOTAL E FK B-STOCK CWT RELEASE						66,383	<u>RETURN IS INCOMPLETE</u>							
TOTAL E FK B-STOCK NON-CWT RELEASE						268,317								
TOTAL E FK B-STOCK RELEASE						334,700	RETURN GRAND TOTAL:		2,502	1,069	3,571	0.17		
TOTAL CWT RELEASE FOR MAGIC VALLEY FH						194,207								
TOTAL NON-CWT RELEASE FOR MAGIC VALLEY FH						1,867,793								

TOTAL MAGIC VALLEY FH RELEASE	2,062,000
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TOTAL PIT TAGS	3,100
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